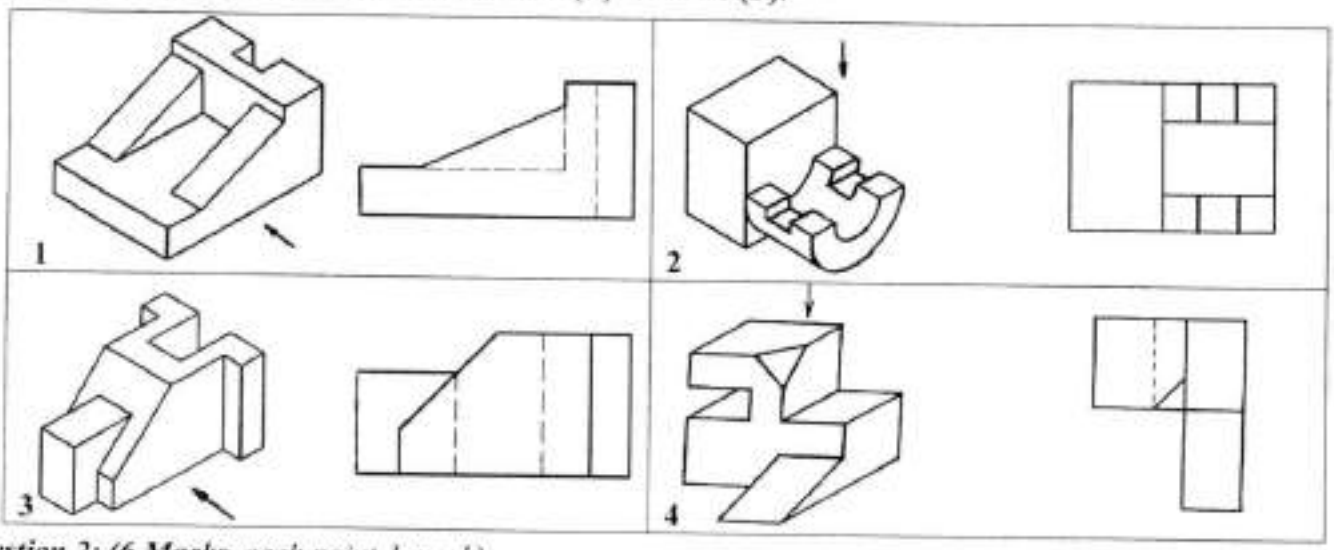
Academic Year: 2021-2022 | *Level: 000 All Specific Programs* | *Exam: Mid-Term Exam (3 Pages)*
Semester: 1st Term (Fall 2021) | *Course Title: Engineering Drawing* | *Allowed Time: 2 Hours*
Date: Sunday 9 January 2022 | *Course Code: PDE052 & PDE041* | *Max. Mark: 50 Marks*

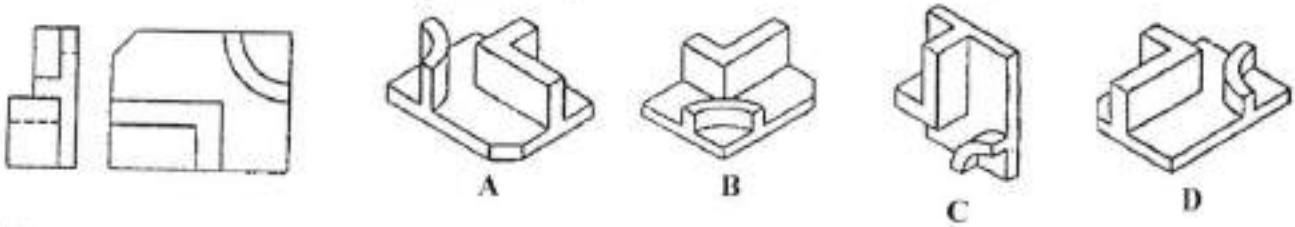
Question 1: ***(4 Marks,*** *each point 1 mark)*

The following question shows a pictorial projection with one of its views according to the arrow direction. **You are required to determine if this view is True (T) or False (F):**

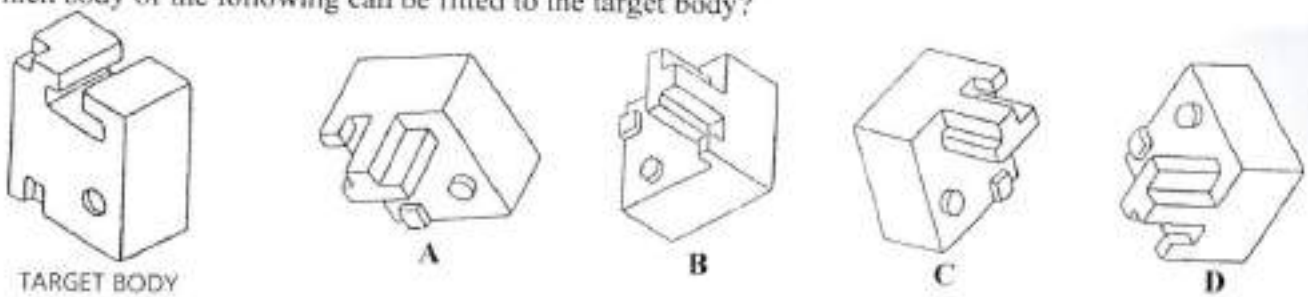


Question 2: ***(6 Marks,*** *each point 1 mark)*

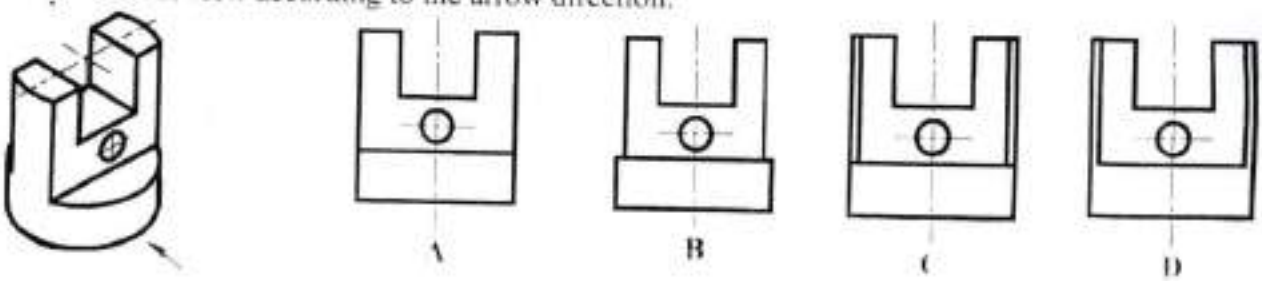
1. Choose the correct isometric for the given views:



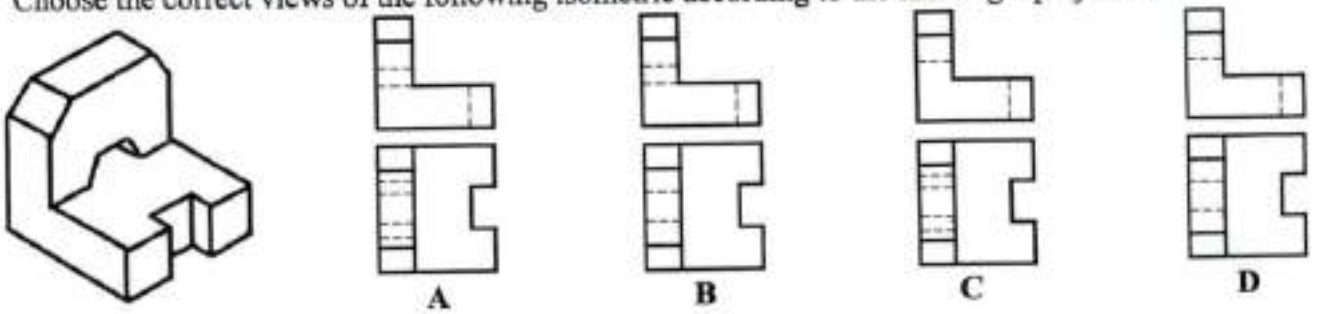
2. Which body of the following can be fitted to the target body?



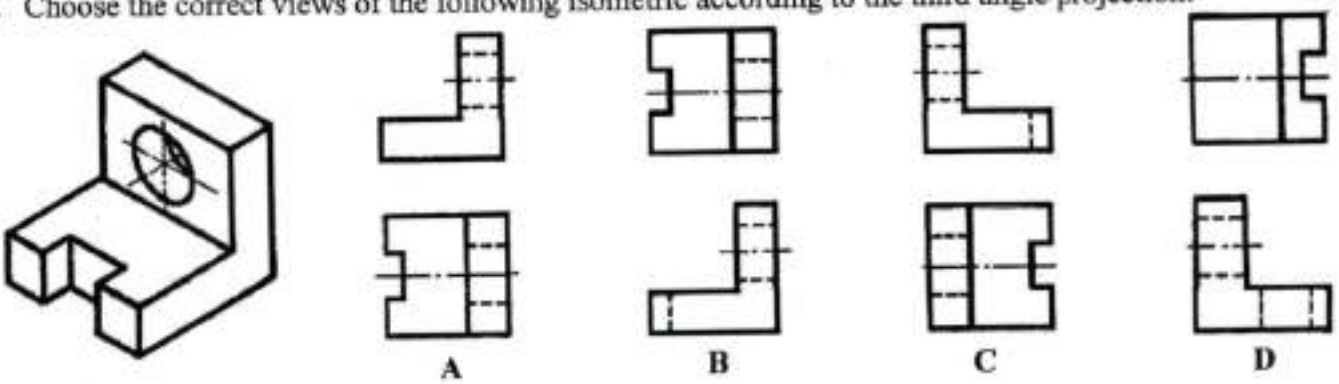
3. Choose the correct view according to the arrow direction:



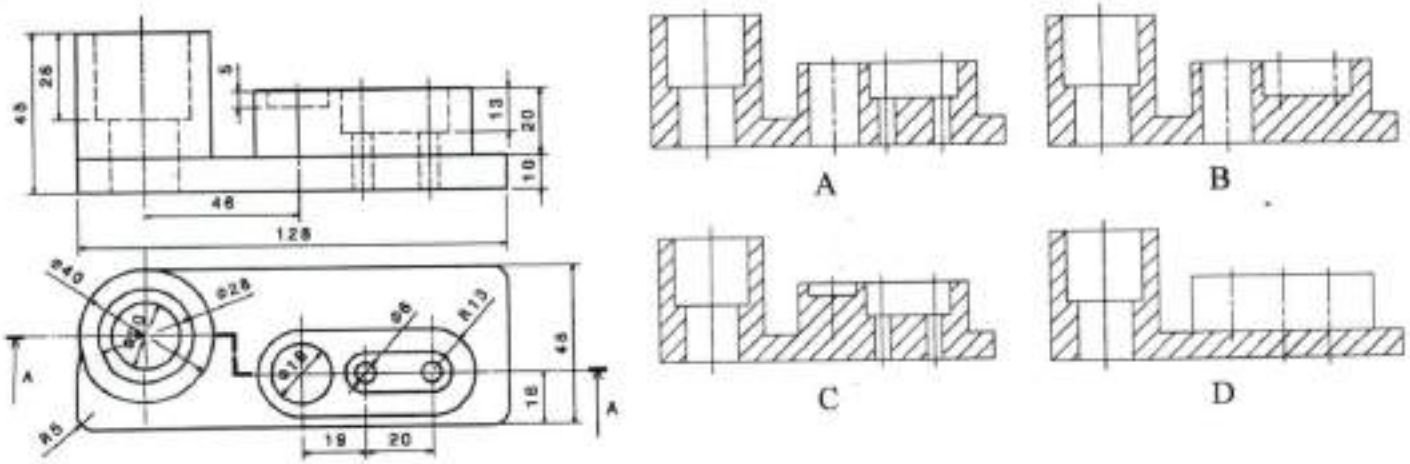
4. Choose the correct views of the following isometric according to the first angle projection:



5. Choose the correct views of the following isometric according to the third angle projection:

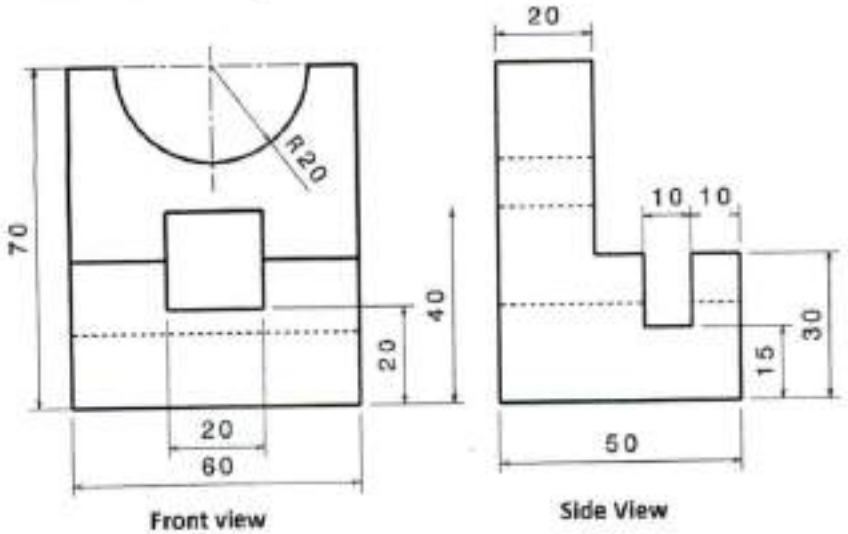


6. The correct sectional view at A-A is:



***Question 3:* (10 Marks)**

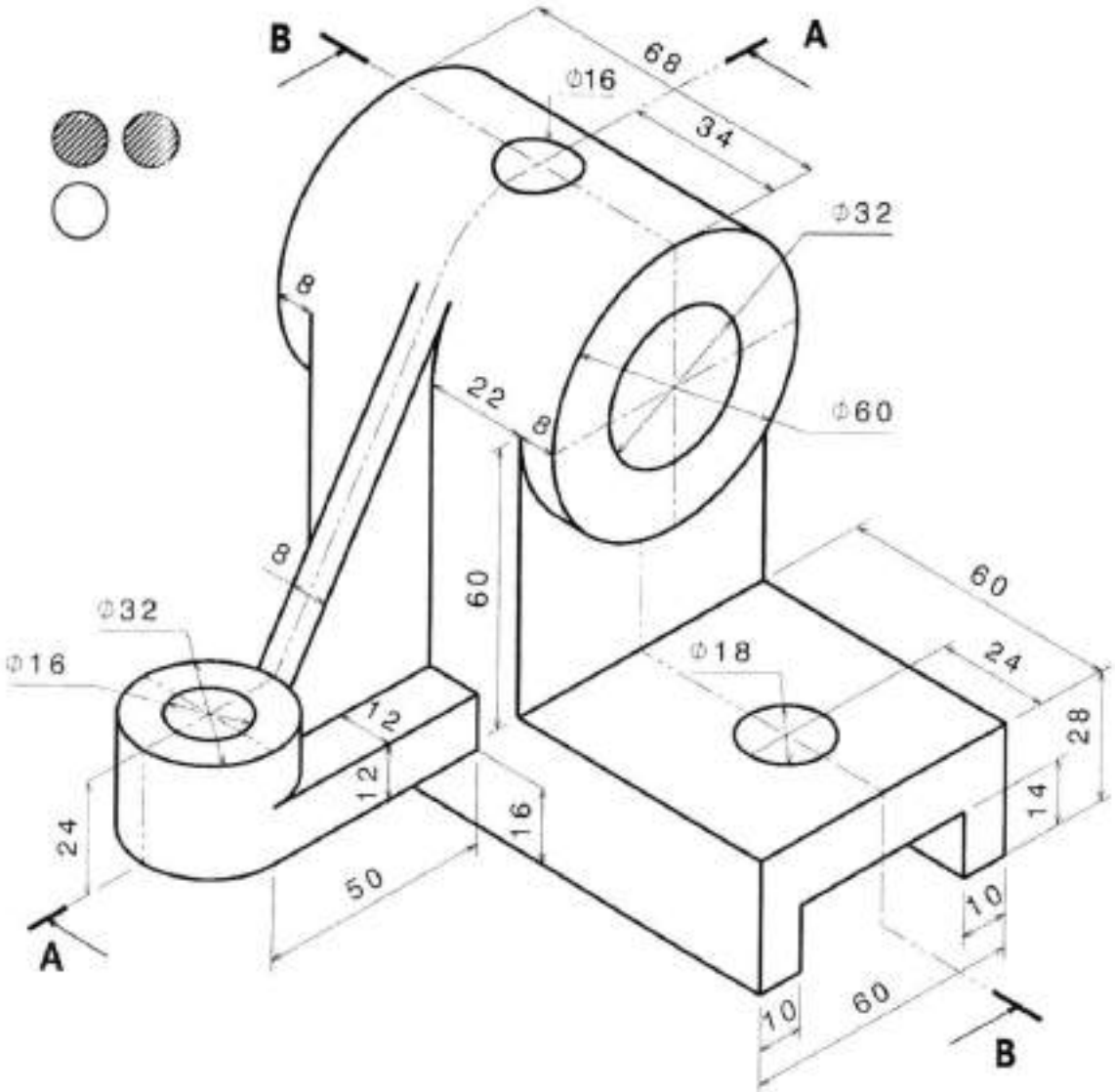
Construct the isometric of the mechanical part which has the given two views shown in next figure.



Question 4: (30 Marks

For the given part sh... n in figure, it is required to draw the followings:

1. Sectional fro... view at AA *(9 Marks)*
2. Sectional sid... iew at BB *(9 Marks)*
3. Top view *(9 Marks)*
4. Finishing and ...riting the dimensions on views *(3 Marks)*



End of Questions

With Our Best Wishes

Associate Prof. Dr. Tawakol A. Enab — *Dr. Mona A. Aboelez*

Dr. Mohamed H. Elshafaei — *Dr. Mostafa A. Elbahloul*

Digital Image Processing
Fall Semester Exam.

Mansoura University
Faculty of Engineering

Biomedical Engineering Program - Level 300
MTE Program – BCE Program
Exam Date: 9-1-2022
Allowed Time: 2 Hours

Attempt all questions. Assume any missed data. Full mark is 50

Q.1) Give a short answer to each of the following questions **[15 Marks]**

a. *"Image processing operations may be divided into three classes based on the information required to perform the transformation".* **Justify this statement. Give a block diagram realization for one of the three classes.**

b. *"The Fourier transform is of fundamental importance to image processing".* **Justify this statement. Write a short note on the *'shifting'* property.**

c. *"Adaptive thresholding can be useful in many situations".* **Justify this statement. State the main applications of thresholding.**

d. *"An appropriate use for the Laplacian is to find the position of edges by locating zero crossings".* **Define the terms 'Laplacian' and 'Zero crossing'. State the main steps of Marr-Hildreth method.**

e. *"There are two methods that can be used in color processing".* **Compare between these methods using block diagrams only.**

Q.2.a) *"On 15-4-2019, a structure fire broke out beneath the roof of Notre-Dame Cathedral in Paris. The building's spire had been destroyed and its upper walls were severely damaged".* **Suggest how can image processing help in the restoration stages of the beloved Cathedral? Is it possible to suggest an image processing system for fire detection?** **[5 Marks]**

Q.2.b) Suppose a 4-bit grey-scale image has the following grey values distribution:

i	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
n_i	10	50	100	45	80	40	20	10	0	0	0	0	0	0	0	5

i. Sketch the histogram of this image. What do you expect about the appearance of this image?

ii. Use histogram equalization to improve the appearance of the image. Sketch the result.

iii. Use histogram stretching to improve the appearance of the image. Sketch the result.

Hint: Use the following stretching function: $j = \frac{14-2}{7-1}(i-1)+2, \quad 1 \le i \le 7$ **[10 Marks]**

Q.3.a) Given a 5x5 image, *X*, and a Roberts edge detector, *H*

$$X = \begin{bmatrix} 115 & 110 & 105 & 105 & 350 \\ 105 & 100 & 100 & 100 & 355 \\ 100 & 140 & 120 & 100 & 350 \\ 110 & 130 & 145 & 115 & 345 \\ 120 & 130 & 130 & 125 & 345 \end{bmatrix} \quad \& \quad H = \begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

Apply the given edge detector to the image? Modify values outside the range [0-255]. Then, apply a suitable threshold to transform the resulting image into a binary one. **[10 Marks]**

Q.3.b) Use the Hough transform to detect the two strongest lines in the binary image shown below. **[10 Marks]**

y \ X	0	1	2	3	4	5	6
0	1	0	0	0	0	0	1
1	1	1	0	0	0	1	0
2	0	0	0	0	0	0	0
3	0	0	0	1	0	0	0
4	1	0	1	0	0	0	0
5	0	1	0	0	0	0	0
6	1		0	0	0	0	0

☺ ***Best wishes*** ☺

Prof. Hossam El-Din Moustafa

Mansoura University

Faculty of Engineering

برنامج الهندسة الطبية والحيوية 2020 - Sophomore

Writing of Technical Reports

Final Term

Course Instructor : Islam Mohamed Ismael Abdallah

First Term

Date : January 2022

Time : 120 minutes

Exam Title : Final Exam

Degree : 50

Model Number : 1

Course Code : ENG 111

Question Num 1 : MCQ [30 Marks]

[1] "Effect of concrete on temperature in buildings" This is … title

(a) Indicative (b) Informative (c) Question-Type (d) No Correct Answer

[2] "Effect of Covid-19 on children" This is … title.

(a) Indicative (b) Informative (c) Question-Type (d) No Correct Answer

[3] Which of the following creates bad impression in interview?

(a) Preparing well (b) Giving examples on your skills (c) Poor personal appearance (d) No Correct Answer

[4] Which of the following establishes the technical report?

(a) Logical conclusion (b) Illogical Conclusion (c) Personal prejudice (d) No Correct Answer

[5] Which of the following is a software for plagiarism detection?

(a) Antivirus (b) Plagiarism (c) Turnitin (d) No Correct Answer

[6] A journal article ends with a …

(a) Reference section (b) Discussion section (c) Results of the experiment (d) Abstract

[7] A list of figures and tables placed on …

(a) Abstract (b) Title page (c) Table of contents (d) Acknowledgement

[8] A list of illustrations placed on …

(a) Abstract (b) Title page (c) Table of contents (d) Acknowledgement

[9] A resume is a word of which language?

(a) German (b) Latin (c) French (d) English

[10] Copying passages of text from someone else's work and use them as if they were your own is called …

(a) Writing (b) Plagiarism (c) Turnitin (d) Patent

[11] Curriculum vitae is a word of which language?

(a) German (b) Latin (c) French (d) English

[12] Good scientific writing can be described as …

(a) Clear, concise, and convoluted (b) Concise, dense, and compelling (c) Clear, concise, and flowery (d) Clear, concise, and compelling

[13] Good technical writing is …

(a) Emotional (b) Precise and subjective (c) Imaginative and funny (d) No Correct Answer

[14] If someone asks you why you're looking for work, what should you NOT say?

(a) "I'm looking for a new challenge." **(b)** "My old boss was a complete idiot." **(c)** "I think this job is right for me based on my experience." **(d)** "My organization was forced to downsize, and I lost my job."

[15] If you have not time to read the whole paper, which section you should read first to learn more about paper?

(a) The Introduction. **(b)** The Conclusion. **(c)** The Results. **(d)** The Abstract.

[16] If you want to complain, what's the best way to behave?

(a) Get very angry **(b)** Get ready to cry **(c)** Stay calm but stick to your point **(d)** No Correct Answer

[17] In a technical report Which of these must be avoided.

(a) Facts **(b)** Logical conclusions **(c)** Subjective evaluation **(d)** No Correct Answer

[18] In an interview when you do not know an answer, you should …

(a) Ignore the question and change the subject **(b)** Confess that you do not know the answer **(c)** Keep guessing **(d)** No Correct Answer

[19] In the … section, you can state your hypothesis.

(a) The Introduction. **(b)** The Conclusion. **(c)** The discussion. **(d)** The Acknowledgment.

[20] In the … section, you could talk about how and why you did or didn't confirm your hypothesis

(a) The Introduction. (b) The Conclusion. (c) The discussion. (d) The Acknowledgment.

[21] Key ideas formed in discussion could be reinforced in …

(a) The Conclusion. (b) The Acknowledgment. (c) The Introduction. (d) The Reference

[22] Reading abstract helps you to know …

(a) What the author did? (b) How the author did it? (c) What the author concluded? (d) All choices are correct

[23] Reading introduction helps you to know …

(a) How the author confirmed his hypothesis? (b) The prior related works (c) The sponsor who helped you (d) No Correct Answer

[24] Reports convey information, answer questions, and …

(a) present your opinions (b) comply with government regulations (c) solve problems (d) No Correct Answer

[25] Reports that provide data or findings, analyses, and conclusions are …

(a) Informational reports (b) Progress reports (c) Summaries (d) Analytical reports

[26] Resume must include

(a) Your skills (b) Your projects (c) Your researches (d) All choices are correct

[27] The … section is the heart of your paper

(a) Acknowledgement (b) Result (c) Appendix (d) Conclusion

[28] The acknowledgement answer the following …

(a) What the author did? (b) How the author did it? (c) What the author found? (d) No Correct Answer

[29] The abstract includes …

(a) Purpose (b) Findings (c) Impact (d) All choices are correct

[30] The abstract may include …

(a) Tables and maps (b) Explained acronyms or abbreviations (c) References to other work (d) No Correct Answer

[31] The introduction includes …

(a) people who helped you (b) Author affiliation (c) Summarizing for prior related works (d) All choices are correct

[32] The language of the resume should be …

(a) Informal (b) Formal (c) Casual (d) No Correct Answer

[33] What body language shows you are listening?

(a) Turning away from the speaker (b) Nodding (c) Looking out of the window (d) No Correct Answer

[34] What is the best way to greet the person interviewing you?

(a) A firm handshake (b) A hesitant wave from a suitable distance (c) A strong hug (d) A kiss on the cheek, just as you would greet a close relative

[35] What should you focus on during the interview?

(a) The salary you want (b) How much vacation time you want (c) What you can offer the company or organization (d) What the company or organization can offer you

[36] When should the student use CV?

(a) when a student want to check paper plagiarism (b) when a student want to get scholarship (c) The CV not used by students, it only used to obtain job after graduation. (d) No Correct Answer

[37] When writing CV, under work experience, the … job is listed at the top

(a) First (b) Latest (c) Best (d) Higher salary

[38] Which is not basis for a technical report?

(a) Facts (b) Tests (c) Personal prejudices (d) Experiments

[39] Which is the best way to follow up with a prospective employer after an interview?

(a) Handwritten note (b) Phone call (c) Email (d) No Correct Answer

[40] Which is the right place for prior related works, and the general overview?

(a) The Introduction. (b) The Conclusion. (c) The Acknowledgment. (d) The Abstract.

[41] Which of the following called a mini paper?

(a) Abstract (b) Title page (c) Table of contents (d) Acknowledgement

[42] Which of the following considered as a bad reference in scientific paper?

(a) University presses **(b)** Wikipedia **(c)** Well known online journals **(d)** No Correct Answer

[43] Which of the following considered as a good reference in scientific paper?

(a) Magazines **(b)** Well known online journals **(c)** Personal blogs **(d)** No Correct Answer

[44] which of the following gives understandable label for area of inquiry

(a) References **(b)** Title **(c)** Results **(d)** Acknowledgement

[45] which of the following is not a feature of good scientific writing?

(a) Clear **(b)** Concise **(c)** Vague **(d)** Direct

[46] Which of the following is not technical writing?

(a) Journal Paper **(b)** Thesis **(c)** Proposal **(d)** No Correct Answer

[47] Which of the following must be avoided in technical writing?

(a) Facts **(b)** Punctuation **(c)** Personal feelings **(d)** No Correct Answer

[48] Which of the following pieces of information is typically not on the title page of a manuscript?

(a) Author names **(b)** Author affiliation **(c)** Keywords **(d)** Research acknowledgements

[49] Which of these is not mentioned in a CV?

(a) E-mail **(b)** Age **(c)** Religion **(d)** Experience

[50] Which of these should be avoided in an interview?

(a) Clarity **(b)** Smile **(c)** Confidence **(d)** Confusion

[51] Which part of the interview is important?

(a) First minutes **(b)** Final minutes **(c)** Answering the questions **(d)** The whole time

[52] Which part of the paper helps readers to decide if the article is relevant for their purposes or not?

(a) The Introduction. **(b)** The Conclusion. **(c)** The Acknowledgment. **(d)** The Abstract.

[53] Which section in the paper includes calculations?

(a) Abstract. **(b)** Introduction. **(c)** Theory and analysis. **(d)** Conclusion.

[54] Which section in the paper includes computer simulation?

(a) Abstract. **(b)** Introduction. **(c)** Theory and analysis. **(d)** Conclusion.

[55] Which section of a journal article usually has the most number of cited articles?

(a) The Introduction. **(b)** The Conclusion. **(c)** The Results. **(d)** The Abstract.

[56] Which section of the article allows readers to have their own evaluation of what the research has found?

(a) Introduction **(b)** References **(c)** Results **(d)** Acknowledgement

[57] While writing, the quoted sentence must be written using …

(a) Your own words (b) Original author's exact words (c) Paraphrasing (d) Summarizing

[58] Why The Turnitin is used?

(a) To rephrase the text (b) To avoid inadvertent plagiarism (c) To summarize the text (d) No Correct Answer

[59] You can explain your problem in … section

(a) The Results. (b) The Conclusion. (c) The Acknowledgment. (d) The Introduction.

[60] Your sponsor and individuals outside of your team who have helped you must be mentioned in the …

(a) The Introduction. (b) The Acknowledgment. (c) The Conclusion. (d) The discussion.

Question Num 2 : T & F [20 Marks]

[1] "What will be my responsibilities in this job?" this is a good question to ask during the job interview.

(a) True (b) False

[2] After interview, you should send thankful e-mail to the interviewer.

(a) True (b) False

[3] Any interests must not be included in your CV even if it has relevant to the job.

(a) True (b) False

[4] At the end of the interview, you should always ask about the next step in the process.

(a) True (b) False

[5] By reviewing the job description you can identify the skills required for the job.

(a) True (b) False

[6] Descriptive abstract contains results, conclusions, and recommendations.

(a) True (b) False

[7] Figure/tables are placed before they are mentioned in the text.

(a) True (b) False

[8] In interview you should emphasize on salary

(a) True (b) False

[9] In interview, Careless appearance creates bad impression

(a) True (b) False

[10] In interview, you are not allowed to ask about training programs.

(a) True (b) False

[11] In negotiation, you must offer a summary about you heard from the other party

(a) True (b) False

[12] Informative abstracts are often written before a project is completed

(a) True (b) False

[13] Informative titles indicate the subject matter of a paper and give an indication of obtained results and conclusions.

(a) True (b) False

[14] It is recommended to start the sentence with an abbreviation.

(a) True (b) False

[15] It is recommended to use Familiar words in technical writing

(a) True (b) False

[16] Originality report is a color coded report which is numbered to indicate any matching text

(a) True (b) False

[17] Results you didn't expect must be excluded from your paper.

(a) True (b) False

[18] Reviewing the job description is not recommended before the interview.

(a) True (b) False

[19] Self confidence in interview creates bad impression

(a) True (b) False

[20] Solitary hobbies such as reading, watching TV, stamp collecting should be included in your CV.

(a) True **(b)** False

[21] Technical writing is characterized by emotional impact.

(a) True **(b)** False

[22] Technical writing is precise, objective, direct, and clearly defined.

(a) True **(b)** False

[23] The abstract is the paper section which helps readers deciding if this paper is relevant to their purposes.

(a) True **(b)** False

[24] The abstract is the right place for prior related works, and the general overview.

(a) True **(b)** False

[25] The abstract must not contain any acronyms or abbreviations

(a) True **(b)** False

[26] The abstract should contain vague statements to force the reader reading the main text

(a) True **(b)** False

[27] The acronyms must be defined at every use in your paper

(a) True **(b)** False

[28] The discussion section of the paper allows any electrical or computer engineer to duplicate your results.

(a) True **(b)** False

[29] The introduction includes recommendations for future work.

(a) True **(b)** False

[30] The introduction is the right place for prior related works, and the general overview.

(a) True **(b)** False

[31] Turnitin is a tool that the university uses to ensure the integrity of your work.

(a) True **(b)** False

[32] Turnitin is software which rephrases the statements in order to reduce the percentage of plagiarism.

(a) True **(b)** False

[33] Wearing casual in interview is always the safest "dress for success"

(a) True **(b)** False

[34] When answering in interview, you should Listen carefully and seek clarification.

(a) True **(b)** False

[35] While negotiation, you have to create options for self-gain.

(a) True **(b)** False

[36] While writing CV, courses and training you have took should be written from oldest to newest

(a) True **(b)** False

[37] While writing CV, using action words such as "developed, planned, created, competed." creates bad impression

(a) True **(b)** False

[38] You are advised to listen carefully while negotiation

(a) True **(b)** False

[39] You are allowed to copy passages of text from someone else's work and use them as if they were your own.

(a) True **(b)** False

[40] You are not allowed to use examples from your actual work experience to answer questions during a job interview.

(a) True **(b)** False

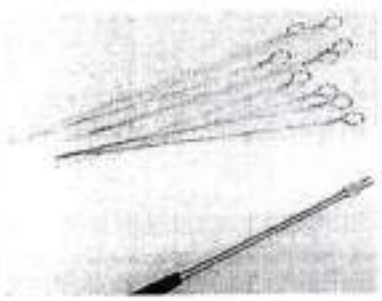
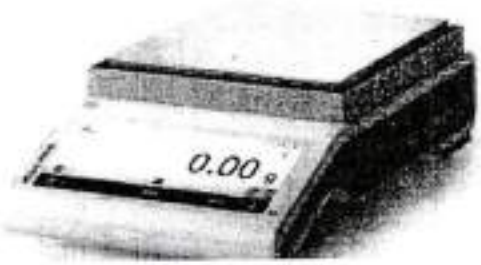
	Mansoura University Fac. of Engineering BME Program Level 300 (6 pages)		Microbiology and Immunology BME392 Time allowed: 2 hours Full Mark:50 Marks	
Final Exam (10-1-2022) – first Semester				

Choose the correct answer for the following statements and make a table, in your answer sheet as shown below to transfer its letter to it: (50 Marks/1 Mark each statement)

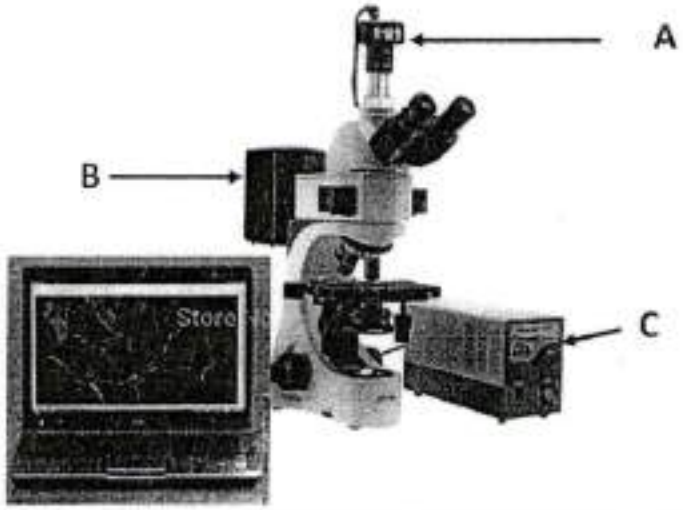
1		11		21		31		41	
2		12		22		32		42	
3		13		23		33		43	
4		14		24		34		44	
5		15		25		35		45	
6		16		26		36		46	
7		17		27		37		47	
8		18		28		38		48	
9		19		29		39		49	
10		20		30		40		50	

يرجى عمل جدول كما بالأعلى فى كراسة الاجابة لينقل به الاحرف الخاصة بالاجابات الصحيحة.

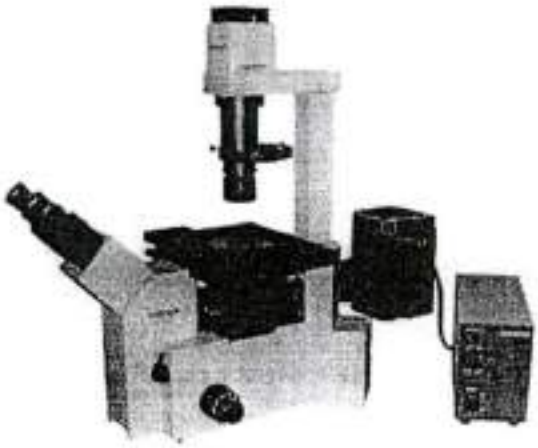
Use the table of these tools and devices to answer the statements from (1-15):

I) 	II) 
III) 	IV) 

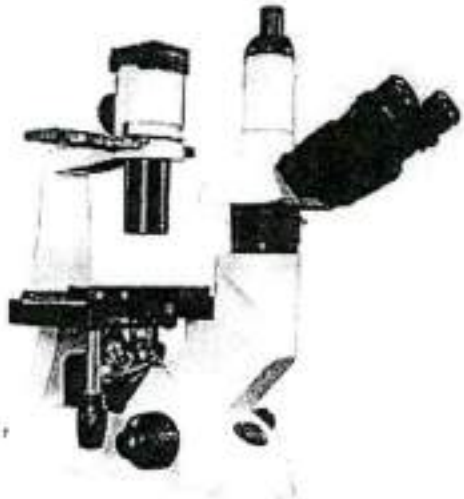
V)



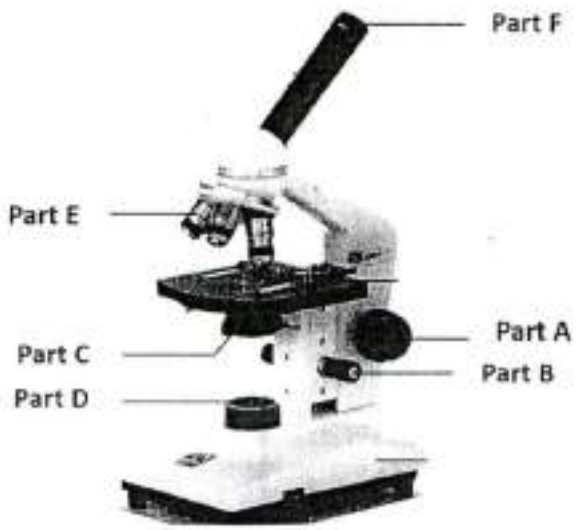
VI)



VII)



VIII)



1- The tool in figure I is called:

a) Loop b) Flame c) Bacteria killer d) Bacterial Pen

2- The device in figure II is called:

a) Weight calibrator b) Electrical balance c) Weight meter d) No answer is correct

3- The device in figure III is called:

a) PH calibrator b) Electronic PH c) PH balance d) PH meter

4- The tool in figure IV is called:

a) Loop b) Flame c) Bacteria killer d) Bacterial Fire

5- For cultivation of bacteria in microbiology lab, the following is used before the step of media sterilization in an autoclave:

a) Figure I b) Figure II c) Figure III d) Both b & c

6- Part A in figure V is called:

a) Digital camera b) Detector c) Mercury lamp d) illuminating source

7- Part B in figure V is called:

a) Condenser b) Power supply c) Mercury lamp d) Digital camera

8- Part C in figure V is called:

a) Digital camera b) Power supply c) Mercury lamp d) Detector

9- An example of inverted microscope is:

a) Figure V b) Figure VI & Figure VII c) Both a & b d) Figure VIII

10- The microscope in .....can be used to examine bacteria:

a) Figure VI b) Figure VII c) Figure VIII d) All the above

11- In figure VIII, ...is called coarse adjustment:

a) Part A b) Part B c) Part C d) Part D

12- In figure VIII, ...is the light source:

a) Part A b) Part B c) Part C d) Part D

13- In figure VIII, ...is an ocular lens:

a) Part C b) Part D c) Part E d) Part F

14- In figure VIII, ...is the fine adjustment:

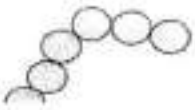
a) Part C b) Part D c) Part E d) Part B

15- Figure VIII is an example of ..... microscope:

a) Bright field b) Inverted c) Fluorescent d) Simple

16- .....Organelle is important for protein synthesis:

a) Mitochondria b) Ribosome c) Nucleus d) Cell membrane

17- The following arrangement "  **"of bacteria is called:**

a) Cocci b) Diplococci c) Staphylococcus d) Streptococci

18- .....is a fluid that contains different organelles of the cells:

a) Cytochrome b) Serum c) Plasma d) Cytoplasm

19- The following shape "  **"of bacteria is called:**

a) Spiral b) Vibrio c) Cocci d) Bacilli

20- ..... is an example of bacteria that forms spores:

a) *Escherichia coli* b) *Bacillus anthracis* c) Staphylococcus aureus d) Candida albicans

21- In *Escherichia coli*, the genus is:

a) *Escherichia* b) *coli* c) *Escherichia coli* d) *E. coli*

22- The following factors are used to classify bacterial according to environment:

a) PH b) Temperature c) Oxygen requirement d) All the above

23- Broad spectrum antibiotic means:

a) Kills bacteria by different mechanisms b) Kills bacteria and spores

c) Active against Gram positive and Gram negative d) Kills bacteria, fungi and viruses

24- Bacteria that is able to cause a disease is called:

a) Pathogenic b) Normal flora c) Commensal d) Non pathogenic

25- .....is used for production of bread and insulin:

a) Escherichia coli b) Bacillus anthracis c) Staphylococcus aureus d) Saccharomyces cerevisiae

26- Carbon and hydrogen are examples of .....:

a) Macronutrients b) Micronutrients c) Trace elements d) Trace nutrients

27- Growth factors are important for the synthesis of.....in bacteria:

a) DNA b) Cytoplasm c) Capsid d) Envelop

28- Most of bacteria are considered as:

a) Mesophiles b) Thermophiles c) Psychrophiles d) Moderate Thermophiles

29- The following is true regarding psychrophiles:

a) It can grow in fridge b) It can be pathogenic c) It can grow at 65 °C d) It can grow at 95 °C

30- The time required for complete growth of bacteria in incubator is:

a) One day b) Two days c) One week d) one month

31- The growth curve of bacteria includes .....phases:

a) 1 b) 2 c) 3 d) 4

32- In the last phase of growth curve, the number of bacteria:

a) Increases b) Decreases c) Is constant d) Increases then decreases

33- In compound microscope, if the magnification power of ocular lens is 10x and that of oil immersion lens is 100x, then the total magnification power is .....:

a) 110x b) 1000x c) 500x d) 1100x

34- The following is true regarding light microscope:

a) It must contain 10x, 40x, 100x magnification power b) It is must contain light source

c) It must be able to examine bacteria d) It must be able to examine virus

35- In microscopes, the number 10x on an objective lens means that:

a) Its magnification power is 100 b) It is called low magnification power

c) It is called oil immersion lens d) It can be used to examine bacteria

36- The following is true regarding GFP:

a) It is an example of fluorescent protein b) When excited gives gray fluorescence

c) It is an example of fluorescent DNA d) It is excited by green light

37- The following shape "  **" of fungi is called:**

a) Yeast b) Hypha c) Mycelium d) Network

38- Example of fungal infections of the skin is.....:

a) Saccharomyces cerevisiae b) Candida albicans c) Tinea d) Herpes

39- Parasites are examined using objective lens of .....magnification power:

a) 10x & 40x b) 100x c) 500x d) 1000x

40- An example of DNA virus is:

a) COVID-19 b) HCV c) Herpes d) Influenza

41- An example of RNA virus is:

a) COVID-19 b) HCV c) Herpes d) Both a & b

42- The following is true regarding viruses:

a) It can replicate in water b) The genetic information is stored always on DNA

c) It is unable to generate energy or synthesize protein d) It can replicate in suitable medium

43- The correct sequence of the virus replication cycle is:

a) Attachment, then penetration, then uncoating

b) Penetration, then Attachment, then uncoating

c) Uncoating, then penetration then attachment

d) Penetration, then uncoating, then Attachment

44- DNA polymerase is present in....:

a) COVID-19 b) HCV c) Herpes d) Influenza

45- The 2nd line of defense includes:

a) Skin b) Tears c) Hair in nose d) Fever

46- The 1st line of defense includes:

a) Skin b) Tears c) Hair in nose d) All the above

47- The immune cells responsible for cellular immunity:

a) B cell b) T cells c) Macrophages d) Plasma cells

48- The immune cells responsible for humoral immunity:

a) B cell b) T cells c) Macrophages d) Red blood cells

49- The 1ry immune organs includes:

a) Thymus b) Lymph nodes c) Spleen d) Skin

50- The 2ry immune organs includes:

a) Lymph nodes b) Skin c) Bone marrow d) Thymus

With all of my best wishes
Mohammed Asaad El-Mowafy

Mansoura University

Faculty of Engineering

200 - الهندسة الطبية والحيوية

Heat and Mass Transfer

Final Term

Course Instructor : محمد رجب المرغني ابو خليل

First Term

Date : January 2022

Time : 120 minutes

Exam Title : انتقال حرارة وكتلة - هندسة طبية - مستوى 200

Degree : 50

Model Number : 1

Course Code : MPE271

Question Num 1 : MCQ [50 Marks]

[1] Conduction through flat composite wall is given by:

(a) $Q = \frac{t_1 - t_4}{\frac{x_1}{k_1 A} + \frac{x_2}{k_2 A} + \frac{x_3}{k_3 A}}$

(b) $Q = \frac{t_1 - t_4}{\frac{k_1 A}{x_1} + \frac{k_2 A}{x_2} + \frac{k_3 A}{x_3}}$

(c) $Q = \frac{(t_1 - t_4)A}{\frac{k_1}{x_1} + \frac{k_2}{x_2} + \frac{k_3}{x_3}}$

(d) $Q = \frac{\frac{k_1 A}{x_1} + \frac{k_2 A}{x_2} + \frac{k_3 A}{x_3}}{t_1 - t_4}$

[2] The coefficient of thermal conductivity is defined as

(a) Quantity of heat transfer per unit area per one degree drop in temperature

(b) Quantity of heat transfer per one degree temperature drop per unit area

(c) Quantity of heat transfer per unit time per unit area

(d) Quantity of heat transfer per unit time per unit area per one degree temperature drop per unit length.

[3] The Fourier's law of heat transfer by conduction is expressed as

(a) $Q = kA\frac{dt}{dx}$

(b) $Q = -kA\frac{dt}{dx}$

(c) $Q = kA\frac{dx}{dt}$

(d) $Q = -kA\frac{dx}{dt}$

[4] ***Stefan-Boltzmann's law is expressed as***

(a) $Q = \sigma A T^4$

(b) $Q = \sigma A^2 T^4$

(c) $Q = \sigma A T^2$

(d) $Q = A T^4$

[5] ***Conduction is a process of heat transfer from***

(a) a hot body to a cold body, in a straight line, without affecting the intervening medium

(b) one particle of the body to another without the actual motion of the particles

(c) one particle of the body to another by the actual motion of the heated particles

(d) none of the above

[6] ***Heat transfer takes place as per law of thermodynamics***

(a) Zeroth **(b)** first **(c)** second **(d)** none of the above

[7] ***Heat conduction in gases is due to***

(a) electromagnetic waves

(b) motion of electrons

(c) mixing motion of the different layers of the gas

(d) elastic impact of molecules

[8] ***In the heat flow equation Q = kA (t1 - t2)/x, the term (t1 - t2)/x is known as***

(a) thermal conductivity

(b) thermal coefficient

(c) thermal resistance

(d) temperature gradient

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[10] ***When the thickness of insulation on a pipe exceeds the critical value.....***

(a) the heat flow rate decreases

(b) the heat flow rate increases

(c) the heat flow rate remains constant

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[11] ***How can the temperature drop in a plane wall with uniformly distributed heat generation be decreased?***

(a) By reducing thermal conductivity of wall material	**(b)** By reducing wall thickness	**(c)** By reducing convection coefficient at the surface	**(d)** By reducing heat generation rate

[12] ***Two insulating materials (put over each other) are used to insulate a steam pipe, best result would be obtained if***

(a) inferior insulation is put over pipe and better one over it	**(b)** better insulation is put over pipe and inferior one over it	**(c)** both may be put in any order	**(d)** none of the above

[13] ***The inner surface of a plane brick wall is at 60°C and the outer surface is at 25°C. Calculate the rate of heat transfer per m2 of the surface area of the wall, which is 220 mm thick. The thermal conductivity of the bricks is 0.51 W/m K.***

(a) 20.65 (W/m2) **(b)** 81.13 (W/m2) **(c)** 47.62 (W/m2) **(d)** 57.95 (W/m2)

[14] ***A composite slab has two layers of different materials with thermal conductivity k1 and k2. If each layer had the same thickness, the equivalent thermal conductivity of the slab would be***

(a)	**(b)**	**(c)**	**(d)**
$k_1 + k_2$	$\frac{(2k_1k_2)}{(k_1+k_2)}$	$\frac{(k_1+k_2)}{(k_1k_2)}$	k_1k_2

[15] ***For a cylinderical rod with uniformly distributed heat sources, the thermal gradient dtldr at half the radius location will be .....of that at the surface.***

(a) one-fourth **(b)** twice **(c)** one-half **(d)** four times

[16] ***In the formulation of Stefan-Boltzmann's law, which of the following parameters does not appear?***

(a) Radiation flux **(b)** Emissivity **(c)** Absorptivity **(d)** Radiating area

[17] ***Which of the following can be used to measure a temperature around -45°C?***

(a) Thermocouple **(b)** Mercury thermometer **(c)** Alcohol thermometer **(d)** None of the above

[18] ***Metals are good conductors of heat because***

(a) they contain free electrons **(b)** they have high density **(c)** their atoms collide frequently **(d)** all of the above

[19] ***?Due to which of the following reasons thermal conductivity of glass wool varies from sample to sample***

(a) Variation in density **(b)** Variation in porosity **(c)** Variation in composition **(d)** Variation in structure

[20] ***The heat transfer equation***

$$\frac{\partial^2 t}{\partial x^2} + \frac{\partial^2 t}{\partial y^2} + \frac{\partial^2 t}{\partial z^2} = 0$$

is known as

(a) Laplace's equation **(b)** Fourier's equation **(c)** Poisson's equation **(d)** General equation of heat transfer

[21] ***:The steady state temperature distribution in the very large thin plate with uniform surface temperature will be***

(a) logarithmic **(b)** parabolic **(c)** hyperbolic **(d)** linear

[22] *A body which partly absorbs and partly reflects but does not allow any radiation to pass through it ($a + r = 1$ and $\tau = 0$) is called*

(a) diamthermanous **(b)** specular **(c)** opaque **(d)** gray

[23] ***The Fourier's conduction heat equation Q = -kA (dt/dx) presumes***

(a) steady state, one-dimensional heat flow **(b)** constant value of thermal conductivity **(c)** constant and uniform temperatures at the wall surfaces **(d)** all of the above

[24] ***Considering a composite wall comprising two layers of thermal conductivities k and 2k, and equal surface areas normal to the direction of heat flow. The outer surfaces of the composite wall are maintained at 100°C and 200°C respectively. If surface temperature at the junction is desired to be 150°C and conduction is the only mode of heat transfer, then ratio of thickness should be***

(a) 1:1 **(b)** 2:1 **(c)** 1:2 **(d)** 2:3

[25] ***Choose the false statement***

(a) Thermal conductivity decreases with increase in the density of the substance **(b)** Thermal conductivity of a damp material is considerably higher than the thermal conductivity of the dry material and water taken individually **(c)** Heat treatment causes considerable variation in thermal conductivity **(d)** Thermal conductivity is always higher in the purest form of metal

[26] ***Two walls of same thickness and cross-sectional area have thermal conductivities in the ratio 2:1. If same temperature difference is maintained across the wall faces, the ratio of heat flow Q1/Q2 will be***

(a) 1/2 **(b)** 2/1 **(c)** 1/1 **(d)** 4/1

[27] ***?Which of the following is anisotropic, i.e., exhibits change in thermal conductivity due to directional preferences***

(a) Glass wool **(b)** Wood **(c)** Concrete **(d)** Masonry brick

[28] ***All the three modes of transmission are involved in***

(a) melting of ice **(b)** cooling of a small metal casting in a quenching bath **(c)** heat flow through the walls of a refrigerator **(d)** automobile engine equipped with a thermo-syphon cooling system

[29] ***?Which of the following forms of water will have the highest value of thermal conductivity***

(a) Boiling water **(b)** Steam **(c)** Solid ice **(d)** Melting ice

[30] ***Most metals are good conductor of heat because of***

(a) energy transport due to molecular vibration **(b)** presence of many free electrons and frequent collision of atoms **(c)** migration of neutrons from hot end to cold end **(d)** capacity to absorb free energy of electrons

[31] ***The metal walls of same wall thickness and cross-sectional area have thermal conductivities k, 2k and 3k respectively. For the same heat transfer, the temperature drops across the wall will be in the ratio:***

(a) 1:2:3 **(b)** 3:2:1 **(c)** 1 : 1 : 3 **(d)** temperature drops ratios cannot be worked out as the given data is insufficient

[32] ***Mark the matter with least value of thermal conductivity***

(a) water **(b)** air **(c)** ash **(d)** window glass

[33] ***Heat transfer by radiation is encountered least in***

(a) boiler furnace **(b)** insulated steam pipe **(c)** electric bulb **(d)** nuclear reactor

[34] ***Heat conduction in gases is due to***

(a) elastic impact of molecules **(b)** motion of electrons **(c)** mixing motion of the different layers of the gas **(d)** electromagnetic waves

[35] ***The temperature of a radiating surface changes from 400°K to 1200°K. The ratio of total emissive powers at the higher and lower temperatures would be***

(a) 3 **(b)** 9 **(c)** 27 **(d)** 81

[36] ***A perfectly black body***

(a) absorbs all the incident radiation **(b)** allows all the incident radiation to pass through it **(c)** reflects all the incident radiation **(d)** has its surface coated with lamp black or graphite

[37] ***Identify the very good insulator***

(a) Saw dust **(b)** Glass wool **(c)** Cork **(d)** Asbestos sheet

[38] ***The essential condition for the transfer of heat from one body to another is***

(a) both bodies must be in physical contact **(b)** heat content of one body must be more than that of the other **(c)** one of the bodies must have a high value of thermal conductivity **(d)** there must exist a temperature difference between the bodies

[39] ***In SI system the unit of thermal conductivity is***

(a) W/m-hr-°C **(b)** W/m.°C **(c)** W/m2-hr-°C **(d)** None of these

[40] ***Fourier's law of heat transfer is applicable for***

(a) conduction only **(b)** convection only **(c)** conduction and convection **(d)** none of these

[41] ***The heat transfer is constant when***

(a) temperature remains constant with time **(b)** temperature decreases with time **(c)** temperature increases with time **(d)** none of the above

[42] ***The average temperature difference between the two fluids in case of parallel-flow heat exchanger as compared to counter-flow heat exchange is***

(a) more **(b)** less **(c)** same **(d)** None of the above

[43] ***Critical radius of a hollow cylinder is defined as***

(a) inner radius which would give maximum heat flow **(b)** outer radius which would give minimum heat flow **(c)** outer radius which would give maximum heat flow **(d)** none of these

[44] ***The rate of heat transfer is constant if***

(a) temperature decreases with time **(b)** temperature increases with time **(c)** temperature is constant **(d)** none of these

[45] ***For heating of a flat plate the hydrodynamic boundary layer is thinner than thermal boundary layer. The value of Prandtl number is***

(a) greater than one **(b)** less than one **(c)** equal to one **(d)** can be less than or greater than one depending upon the value of Reynolds number

[46] ***The units of thermal resistance are***

(a) **(b)** $\frac{m.^{\circ}C}{w}$ **(c)** **(d)** none of these

[47] ***Correction is applied to LMTD for***

(a) parallel flow **(b)** counter flow **(c)** cross-flow **(d)** none of these

[48] ***Prandtl number is the ratio of***

(a) momentum diffusivity to mass diffusivity **(b)** momentum diffusivity to thermal diffusivity **(c)** mass diffusivity to thermal diffusivity **(d)** none of these

[49] ***In a two-fluid heat exchanger, the inlet and outlet temperatures of the hot fluid are 65°C and 40°C respectively. For the cold fluid, these are 15°C and 42°C. The heat exchanger is a***

(a) parallel flow heat exchanger **(b)** counter flow heat exchanger **(c)** heat exchanger device where both parallel flow and counter flow operations are possible **(d)** none of the above

[50] ***In counter flow heat exchanger, the inlet and outlet temperatures of the hot fluid are 65°C and 40°C respectively. For the cold fluid, these are 15°C and 45°C. The LMTD is***

(a) 25 **(b)** 22 **(c)** 28 **(d)** 20

[51] ***Heat transmission is directly linked with the transport of medium itself, i.e., there is actual motion of heated particles during***

(a) conduction only **(b)** convection only **(c)** radiation only **(d)** conduction as well as radiation

[52] ***Which dimensionless number has a significant role in forced convection***

(a) Prandtl number **(b)** Reynolds number **(c)** Mach number **(d)** Peclet number

[53] ***The normal automobile radiator is a heat exchanger of the type***

(a) direct contact **(b)** parallel-flow **(c)** counter-flow **(d)** cross-flow

[54] ***In a double pipe parallel flow heat exchanger, there occurs condensation of saturated steam over the inner tube. Subsequently, the entrance and exit connections of the cooling medium are interchanged. The ratio of steam condensation***

(a) will increase **(b)** will decrease **(c)** will remain unchanged **(d)** may increase or decrease depending upon saturated temperature of steam and inlet temperature of cooling medium

[55] ***Choose the correct statement with respect to a parallel flow heat exchanger***

(a) Both the fluids at inlet are in their coldest state **(b)** Both the fluids at exit are in their hottest state **(c)** Both the fluids at inlet are in their hottest state **(d)** One fluid is hottest and the other is coldest at inlet

[56] The flow rate of cooling water is 0.7 kg/s through the steel inner tube of internal radius of 3 cm. Reynolds number will be

The properties of water

$\rho = 990.1\ kg/m^3$ $Pr = 3.91$

$k = 0.637\ W/m\text{-}K$ $\nu = \mu/\rho = 0.602 \times 10^{-6}\ m^2/s$

(a) 49843 **(b)** 24922 **(c)** 99688 **(d)** 12461

[57] The unit of Nu Number is

(a) m2/hr°C **(b)** m2/hr **(c)** W/m2 **(d)** Dimensionless

[58] The flow rate of cooling water is 0.55 kg/s through the steel inner tube of internal diameter Di = 6 cm and negligible thickness, while the flow rate of oil through the outer tube (D = 12 cm) is 0.6 kg/s. The oil and water enter at temperatures of 110°C and 25°C, respectively. Internal heat transfer coefficient is 950 W/m2°C and the external heat transfer coefficient is 350 W/m2°C. The overall heat transfer coefficient will be

(a) 1300 **(b)** 0.004 **(c)** 250 **(d)** 650

[59] In a counter-flow heat exchanger, water is heated at the rate of 1.5 kg/s from 40° C to 80° C and oil entering at 120°C and leaving 60°C. The specific heats of water and oil are 4.2 kJ/kg-K and 2 kJ/kg-K, respectively. The overall heat transfer coefficient is 400 W/m2.K. The required heat transfer surface area (m2) is

(a) 0.104 **(b)** 0.022 **(c)** 10.4 **(d)** 21.84

[60] A heat exchanger is used to heat cold water at 15°C entering at a rate of 5 kg/s by hot air at 90°C entering also at rate of 5 kg/s.The specific heats of water and air are 4.2 kJ/kg-K and 1 kJ/kg-K, respectively If the exit temperature of hot air is 20°C, the exit temperature of cold water is

(a) 27°C **(b)** 32°C **(c)** 52°C **(d)** 85°C

[61] ***The Nusselt number in natural heat transfer is a function of fluid Prandtl number and***

(a) Stanton number **(b)** Biot number **(c)** Grashoff number **(d)** Reynolds number

[62] ***The Nusselt number in forced heat transfer is a function of fluid Prandtl number and***

(a) Reynolds number **(b)** Grashoff number **(c)** Biot number **(d)** Stanton number

[63] ***Consider natural convection heat transfer between a vertical tube surface and a fluid surrounding it. For dimensional analysis of the problem, the characteristic length corresponds to***

(a) length of the tube **(b)** diameter of the tube **(c)** perimeter of the tube **(d)** either length or diameter of the tube

[64] ***In a convective heat transfer situation, Reynolds number is very large but the Prandtl number is so small that the product (Re . Pr) is less than one. In such a situation***

(a) thermal boundary layer does not exist **(b)** viscous boundary layer thickness equals the thermal boundary layer thickness **(c)** viscous boundary layer thickness is less than the thermal boundary layer thickness **(d)** viscous boundary layer thickness is greater than the thermal boundary layer thickness

[65] ***The law governing the distribution of radiant energy over wavelength for a black body at fixed temperature is referred to as***

(a) Planck's law **(b)** Wien's formula **(c)** Kirchhoff's law **(d)** Lambert's law

[66] ***Choose the false statement***

(a) Thermal conductivity is always higher in the purest form of metal **(b)** Heat treatment causes considerable variation in thermal conductivity **(c)** Thermal conductivity of a damp material is considerably higher than the thermal conductivity of the dry material and water taken individually **(d)** Thermal conductivity decreases with increase in the density of the substance

[67] *A 15-cm X 20-cm circuit board houses on its surface 120 closely spaced logic chips, each dissipating 0.12 W. If the heat transfer from the back surface of the board is negligible, determine the amount of heat this circuit board dissipates during a 10-hour period*

(a) 0.144 kWh **(b)** 0.0144 kWh **(c)** 480 Wh **(d)** 0.480 kWh

[68] *A 5 kg aluminum ball is to be heated from 80°C to an average temperature of 200°C. Taking the specific heat of aluminum in this temperature range to be Cp = 0.90 kJ/kg.°C,, determine the amount of energy that needs to be transferred to the aluminum ball*

(a) 515 kJ **(b)** *540 kJ* **(c)** *515 kW* **(d)** *540 kW*

[69] *A logic chip used in a computer dissipates 3 W of power in environment at 120°F, and has a heat transfer surface area of 0.08 in2. Assuming the heat transfer from the surface to be uniform, determine the amount of heat this chip dissipates during an eight-hour work day*

(a) 0.024 kWh **(b)** 0.24 kWh **(c)** 0.24 kJ/h **(d)** 0.024 kJ/h

[70] ***Radiation heat transfer is characterised by***

(a) energy transport as a result of bulk fluid motion	**(b)** thermal energy transfer as vibrational energy in the lattice structure of the material	**(c)** movement of discrete packets of energy as electromagnetic waves	**(d)** circulation of fluid motion by bouyancy effects

Mansoura University

Faculty of Engineering

الهندسة الطبية والحيوية - 200

Heat and Mass Transfer

Final Term

Course Instructor : محمد رجب المرغني ابو خليل

First Term

Date : January 2022

Time : 120 minutes

Exam Title : انتقال حرارة وكتلة - هندسة طبية - مستوى 200

Degree : 50

Model Number : 1

Course Code : MPE271

Question Num 1 : MCQ [50 Marks]

[1] Conduction through flat composite wall is given by:

(a) $Q = \frac{t_1 - t_4}{\frac{x_1}{k_1 A} + \frac{x_2}{k_2 A} + \frac{x_3}{k_3 A}}$

(b) $Q = \frac{t_1 - t_4}{\frac{k_1 A}{x_1} + \frac{k_2 A}{x_2} + \frac{k_3 A}{x_3}}$

(c) $Q = \frac{(t_1 - t_4)A}{\frac{k_1}{x_1} + \frac{k_2}{x_2} + \frac{k_3}{x_3}}$

(d) $Q = \frac{\frac{k_1 A}{x_1} + \frac{k_2 A}{x_2} + \frac{k_3 A}{x_3}}{t_1 - t_4}$

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(a) Quantity of heat transfer per unit area per one degree drop in temperature

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(b) one particle of the body to another without the actual motion of the particles

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[17] ***Which of the following can be used to measure a temperature around -45°C?***

(a) Thermocouple (b) Mercury thermometer (c) Alcohol thermometer (d) None of the above

[18] ***Metals are good conductors of heat because***

(a) they contain free electrons (b) they have high density (c) their atoms collide frequently (d) all of the above

[19] ***?Due to which of the following reasons thermal conductivity of glass wool varies from sample to sample***

(a) Variation in density (b) Variation in porosity (c) Variation in composition (d) Variation in structure

[20] ***The heat transfer equation***

$$\frac{\partial^2 t}{\partial x^2} + \frac{\partial^2 t}{\partial y^2} + \frac{\partial^2 t}{\partial z^2} = 0$$

is known as

(a) Laplace's equation (b) Fourier's equation (c) Poisson's equation (d) General equation of heat transfer

[21] ***:The steady state temperature distribution in the very large thin plate with uniform surface temperature will be***

(a) logarithmic (b) parabolic (c) hyperbolic (d) linear

[22] *A body which partly absorbs and partly reflects but does not allow any radiation to pass through it ($a + r = 1$ and $\tau = 0$) is called*

(a) diamthermanous (b) specular (c) opaque (d) gray

[23] *The Fourier's conduction heat equation Q = -kA (dt/dx) presumes*

(a) steady state, one-dimensional heat flow (b) constant value of thermal conductivity (c) constant and uniform temperatures at the wall surfaces (d) all of the above

[24] ***Considering a composite wall comprising two layers of thermal conductivities k and 2k, and equal surface areas normal to the direction of heat flow. The outer surfaces of the composite wall are maintained at 100°C and 200°C respectively. If surface temperature at the junction is desired to be 150°C and conduction is the only mode of heat transfer, then ratio of thickness should be***

(a) 1:1 (b) 2:1 (c) 1:2 (d) 2:3

[25] ***Choose the false statement***

(a) Thermal conductivity decreases with increase in the density of the substance (b) Thermal conductivity of a damp material is considerably higher than the thermal conductivity of the dry material and water taken individually (c) Heat treatment causes considerable variation in thermal conductivity (d) Thermal conductivity is always higher in the purest form of metal

[26] ***Two walls of same thickness and cross-sectional area have thermal conductivities in the ratio 2:1. If same temperature difference is maintained across the wall faces, the ratio of heat flow Q1/Q2 will be***

(a) **1/2** (b) 2/1 (c) 1/1 (d) 4/1

[27] ***?Which of the following is anisotropic, i.e., exhibits change in thermal conductivity due to directional preferences***

(a) Glass wool (b) Wood (c) Concrete (d) Masonry brick

[28] *All the three modes of transmission are involved in*

(a) melting of ice (b) cooling of a small metal casting in a quenching bath (c) heat flow through the walls of a refrigerator (d) automobile engine equipped with a thermo-syphon cooling system

[29] *?Which of the following forms of water will have the highest value of thermal conductivity*

(a) Boiling water (b) Steam (c) Solid ice (d) Melting ice

[30] *Most metals are good conductor of heat because of*

(a) energy transport due to molecular vibration (b) presence of many free electrons and frequent collision of atoms (c) migration of neutrons from hot end to cold end (d) capacity to absorb free energy of electrons

[31] *The metal walls of same wall thickness and cross-sectional area have thermal conductivities k, 2k and 3k respectively. For the same heat transfer, the temperature drops across the wall will be in the ratio:*

(a) 1:2:3 (b) 3:2:1 (c) 1 : 1 : 3 (d) temperature drops ratios cannot be worked out as the given data is insufficient

[32] *Mark the matter with least value of thermal conductivity*

(a) water (b) air (c) ash (d) window glass

[33] *Heat transfer by radiation is encountered least in*

(a) boiler furnace (b) insulated steam pipe (c) electric bulb (d) nuclear reactor

[34] *Heat conduction in gases is due to*

(a) elastic impact of molecules (b) motion of electrons (c) mixing motion of the different layers of the gas (d) electromagnetic waves

[35] ***The temperature of a radiating surface changes from 400°K to 1200°K. The ratio of total emissive powers at the higher and lower temperatures would be***

(a) 3 (b) 9 (c) 27 (d) 81

[36] *A perfectly black body*

(a) absorbs all the incident radiation (b) allows all the incident radiation to pass through it (c) reflects all the incident radiation (d) has its surface coated with lamp black or graphite

[37] ***Identify the very good insulator***

(a) Saw dust (b) Glass wool (c) Cork (d) Asbestos sheet

[38] ***The essential condition for the transfer of heat from one body to another is***

(a) both bodies must be in physical contact (b) heat content of one body must be more than that of the other (c) one of the bodies must have a high value of thermal conductivity (d) there must exist a temperature difference between the bodies

[39] ***In SI system the unit of thermal conductivity is***

(a) W/m-hr-°C (b) W/m.°C (c) W/m2-hr-°C (d) None of these

[40] *Fourier's law of heat transfer is applicable for*

(a) conduction only (b) convection only (c) conduction and convection (d) none of these

[41] *The heat transfer is constant when*

(a) temperature remains constant with time (b) temperature decreases with time (c) temperature increases with time (d) none of the above

[42] *The average temperature difference between the two fluids in case of parallel-flow heat exchanger as compared to counter-flow heat exchange is*

(a) more (b) less (c) same (d) None of the above

[43] *Critical radius of a hollow cylinder is defined as*

(a) inner radius which would give maximum heat flow (b) outer radius which would give minimum heat flow (c) outer radius which would give maximum heat flow (d) none of these

[44] *The rate of heat transfer is constant if*

(a) temperature decreases with time (b) temperature increases with time (c) temperature is constant (d) none of these

[45] *For heating of a flat plate the hydrodynamic boundary layer is thinner than thermal boundary layer. The value of Prandtl number is*

(a) greater than one (b) less than one (c) equal to one (d) can be less than or greater than one depending upon the value of Reynolds number

[46] *The units of thermal resistance are*

(a) (b) $\frac{m.^{\circ}C}{w}$ (c) (d) none of these

[47] ***Correction is applied to LMTD for***

(a) parallel flow (b) counter flow (c) cross-flow (d) none of these

[48] ***Prandtl number is the ratio of***

(a) momentum diffusivity to mass diffusivity (b) momentum diffusivity to thermal diffusivity (c) mass diffusivity to thermal diffusivity (d) none of these

[49] ***In a two-fluid heat exchanger, the inlet and outlet temperatures of the hot fluid are 65°C and 40°C respectively. For the cold fluid, these are 15°C and 42°C. The heat exchanger is a***

(a) parallel flow heat exchanger (b) counter flow heat exchanger (c) heat exchanger device where both parallel flow and counter flow operations are possible (d) none of the above

[50] ***In counter flow heat exchanger, the inlet and outlet temperatures of the hot fluid are 65°C and 40°C respectively. For the cold fluid, these are 15°C and 45°C. The LMTD is***

(a) 25 (b) 22 (c) 28 (d) 20

[51] ***Heat transmission is directly linked with the transport of medium itself, i.e., there is actual motion of heated particles during***

(a) conduction only (b) convection only (c) radiation only (d) conduction as well as radiation

[52] ***Which dimensionless number has a significant role in forced convection***

(a) Prandtl number (b) Reynolds number (c) Mach number (d) Peclet number

[53] ***The normal automobile radiator is a heat exchanger of the type***

(a) direct contact (b) parallel-flow (c) counter-flow (d) cross-flow

[54] ***In a double pipe parallel flow heat exchanger, there occurs condensation of saturated steam over the inner tube. Subsequently, the entrance and exit connections of the cooling medium are interchanged. The ratio of steam condensation***

(a) will increase (b) will decrease (c) will remain unchanged (d) may increase or decrease depending upon saturated temperature of steam and inlet temperature of cooling medium

[55] ***Choose the correct statement with respect to a parallel flow heat exchanger***

(a) Both the fluids at inlet are in their coldest state (b) Both the fluids at exit are in their hottest state (c) Both the fluids at inlet are in their hottest state (d) One fluid is hottest and the other is coldest at inlet

[56] The flow rate of cooling water is 0.7 kg/s through the steel inner tube of internal radius of 3 cm. Reynolds number will be

The properties of water

$\rho = 990.1\ kg/m^3$ $Pr = 3.91$

$k = 0.637\ W/m\cdot K$ $\nu = \mu/\rho = 0.602 \times 10^{-6}\ m^2/s$

(a) 49843 (b) 24922 (c) 99688 (d) 12461

[57] The unit of Nu Number is

(a) m2/hr°C (b) m2/hr (c) W/m2 (d) Dimensionless

[58] The flow rate of cooling water is 0.55 kg/s through the steel inner tube of internal diameter Di = 6 cm and negligible thickness, while the flow rate of oil through the outer tube (D = 12 cm) is 0.6 kg/s. The oil and water enter at temperatures of 110°C and 25°C, respectively. Internal heat transfer coefficient is 950 W/m2°C and the external heat transfer coefficient is 350 W/m2°C. The overall heat transfer coefficient will be

(a) 1300 **(b)** 0.004 **(c)** 250 **(d)** 650

[59] In a counter-flow heat exchanger, water is heated at the rate of 1.5 kg/s from 40° C to 80° C and oil entering at 120°C and leaving 60°C. The specific heats of water and oil are 4.2 kJ/kg-K and 2 kJ/kg-K, respectively. The overall heat transfer coefficient is 400 W/m2.K. The required heat transfer surface area (m2) is

(a) 0.104 **(b)** 0.022 **(c)** 10.4 **(d)** 21.84

[60] A heat exchanger is used to heat cold water at 15°C entering at a rate of 5 kg/s by hot air at 90°C entering also at rate of 5 kg/s.The specific heats of water and air are 4.2 kJ/kg-K and 1 kJ/kg-K, respectively If the exit temperature of hot air is 20°C, the exit temperature of cold water is

(a) 27°C **(b)** 32°C **(c)** 52°C **(d)** 85°C

[61] ***The Nusselt number in natural heat transfer is a function of fluid Prandtl number and***

(a) Stanton number **(b)** Biot number **(c)** Grashoff number **(d)** Reynolds number

[62] ***The Nusselt number in forced heat transfer is a function of fluid Prandtl number and***

(a) Reynolds number **(b)** Grashoff number **(c)** Biot number **(d)** Stanton number

[63] *Consider natural convection heat transfer between a vertical tube surface and a fluid surrounding it. For dimensional analysis of the problem, the characteristic length corresponds to*

(a) length of the tube (b) diameter of the tube (c) perimeter of the tube (d) either length or diameter of the tube

[64] *In a convective heat transfer situation, Reynolds number is very large but the Prandtl number is so small that the product (Re . Pr) is less than one. In such a situation*

(a) thermal boundary layer does not exist (b) viscous boundary layer thickness equals the thermal boundary layer thickness (c) viscous boundary layer thickness is less than the thermal boundary layer thickness (d) viscous boundary layer thickness is greater than the thermal boundary layer thickness

[65] *The law governing the distribution of radiant energy over wavelength for a black body at fixed temperature is referred to as*

(a) Planck's law (b) Wien's formula (c) Kirchhoff's law (d) Lambert's law

[66] *Choose the false statement*

(a) Thermal conductivity is always higher in the purest form of metal (b) Heat treatment causes considerable variation in thermal conductivity (c) Thermal conductivity of a damp material is considerably higher than the thermal conductivity of the dry material and water taken individually (d) Thermal conductivity decreases with increase in the density of the substance

[67] *A 15-cm X 20-cm circuit board houses on its surface 120 closely spaced logic chips, each dissipating 0.12 W. If the heat transfer from the back surface of the board is negligible, determine the amount of heat this circuit board dissipates during a 10-hour period*

(a) 0.144 kWh **(b)** 0.0144 kWh **(c)** 480 Wh **(d)** 0.480 kWh

[68] *A 5 kg aluminum ball is to be heated from 80°C to an average temperature of 200°C. Taking the specific heat of aluminum in this temperature range to be Cp = 0.90 kJ/kg.°C,, determine the amount of energy that needs to be transferred to the aluminum ball*

(a) 515 kJ **(b)** *540 kJ* **(c)** *515 kW* **(d)** *540 kW*

[69] *A logic chip used in a computer dissipates 3 W of power in environment at 120°F, and has a heat transfer surface area of 0.08 in2. Assuming the heat transfer from the surface to be uniform, determine the amount of heat this chip dissipates during an eight-hour work day*

(a) 0.024 kWh **(b)** 0.24 kWh **(c)** 0.24 kJ/h **(d)** 0.024 kJ/h

[70] ***Radiation heat transfer is characterised by***

(a) energy transport as a result of bulk fluid motion	**(b)** thermal energy transfer as vibrational energy in the lattice structure of the material	**(c)** movement of discrete packets of energy as electromagnetic waves	**(d)** circulation of fluid motion by bouyancy effects

Engineering Mathematics and Physics Department
Faculty of Engineering, Mansoura University

Engineering Chemistry (BAS 041) | Final Term Exam (New Prog.) | **Model A**

Time : 2 hr. | 16 /1/2022 | Total marks: 50

Answer the following quistion

Question (1): Which of the following statements are True and which are false? (15 Marks)

1. In a gas, the individual molecules are close together and are constantly in contact with neighbors.
2. Frequently, A substance exists in all three separate states of matter at the same time.
3. Collisions between molecules or between a molecule and an inert surface are perfectly plastic, with no change in the total kinetic energy of the gas molecules.
4. At constant temperature and volume, pressure is inversely proportional to the number of moles of gas.
5. The value of the Universal gas constant $R = 8.314*10^{-3}$ k Joule/ mole K
6. The extent of nonideality of real gas can be seen by examining quantity (PV/RT) for one mole of the gas.
7. The maximum possible work that can be derived from a spontaneous process occurring at constant temperature and pressure is equal to the enthalpy.
8. Two factors that control the spontaneity of reactions are internal energy and enthalpy.
9. ΔE and ΔH differ by the amount of work done by or in the system when it only contracts under the opposing pressure of the atmosphere.
10. The heat changing for a process carried out at constant volume, (Q_v), are equal to changing in enthalpy, (ΔH).
11. Enthalpy is a property relating internal energy and the product of pressure and volume.
12. The change in entropy for a process ΔS, depends only on the initial and final states of the system and not on the particular pathway by which it changes from one state to another.
13. The standard state for a gas is the hypothetical state in which the gas has any pressure and at specified temperature and the gas has an ideal behavior.
14. The Third law of thermodynamics state that The entropy of an element or a compound present in the form of a perfectly ordered crystal is greater than zero at the absolute zero of temperature
15. If other factors are held constant, any mixing process that results in a random mixing of molecules represents an increase in entropy.
16. For a system of fixed composition the change in its internal energy, (ΔE), may occur due to exchange of heat with the surroundings and Performance of work or one of them.
17. If you are increasing the solute concentration, the raise of a solution osmotic pressure occure.
18. The boiling point elevation of the solution is lower than that of the pure solvent.
19. The Henry's law constant is doubled if you double the partial pressure of a gas over a liquid at constant temperature.
20. The molality of a solution is the number of moles of the solute per kilogram of solvent contained in solution.
21. The freezing point of the solution (nonvolatile solute with a liquid solvent) is unchanged by addition of the solvent.
22. The reaction quotient is the ratio of product to reactant for non equilibrium activities or concentrations.
23. When an electrical field is applied to electrolyte solution, the positive ions will migrate toward the electrode with the negative charge, (anode).
24. Corrosion is defined as the reduction of metals by interaction with the environment.
25. Most materials occur in nature in the form of a hydroxide or oxide, and the metal is produced through reduction of the ore.
26. One method divides corrosion into low-pressure and high pressure corrosion.
27. Acid solutions containing dissolved oxygen will be less corrosive than air free acids.
28. Activation polarization refers to electro-chemical reaction, which are controlled by diffusion in the electrolyte.
29. Essentially, passivity refers to the loss of chemical activity experienced by certain metals and alloys under particular environmental condition.
30. For some metals and it's alloys, at very high concentrations of oxidizers, or in the presence of very powerful oxidizers, the corrosion rate again increases with increasing oxidizer power. This region is termed active region.

You are given That: C=12, H=1, N=14, O=16 gm/mol

Question (2) Choose the correct answer for the following (35 Marks)

Air has a weight composition as, CO_2 = 0.44%, O_2 = 22.16%, H_2O=1.8% at 25 °C and 760 torr.?

1. The moles fraction of N_2 is .....
   a) Y = 0.356 b) Y =0.229 c) Y = 0.286 d) Y=0.771
2. The average molecular weight of air is .....gm/mol.
   a) M_w=28.55 b) M_w= 29.56 c) M_w= 30.1 d) M_w= 29.65
3. The density of air is .....mg/l
   a) ρ= 11.68 b) ρ =116.8 c) ρ = 1.168 d) ρ =1168
4. The partial pressure of H_2O is .....mmHg
   a) P= 0.2855 b) P =21.7 c) P = 0.255. d) P = 58.96

The temperature of 56 g nitrogen gas, (N_2) at a pressure of 1246.4 mmHg was raised to 327 °C at constant volume. The final pressssure was 1869.6 mmHg. Consider nitrogen behaves as an ideal gas during this process and the specific heat of nitrogen gas at constant pressure C_p = (6.5 +0.001T) cal/mole-k.

5. The number of moles of N_2 is .....
   a) n= 1 mole b) n=2.5 mole c) n=1.75 mole d) n=2 mole
6. The startng temperature is is .....
   a) T=400K b) T =300 K c) T =200 K d) T =600 K
7. The work done on the system is .....
   a) W=20.4 cal. b) W=160.4 cal. c) W= 0 cal. d) W=- 16.4 cal.
8. The heat changed (Q) is .....
   a) ΔQ= 1274 cal. b) ΔQ =2800 cal. c) ΔQ = -2800cal. d) ΔQ = -1274 cal.
9. The internal energy changed, is .....
   a) ΔE= 5290cal. b) ΔE= -2800 cal. c) ΔE= 2800 cal. d) ΔE= -5290.4cal.

An ideal solution of 4.6g toluene (C_7H_8) in 386.1g Benzene (C_6H_6) has a total vapor pressure 749 mmHg and density of 0.9 g/cm³. For benzene, the vapor pressures P^o is 753 mmHg., T^o_b = 80.1 °C, T^o_f = 5.5 °C, K_b= 2.53 (deg. kg) /mole, K_f= 5.12 (deg. kg) /mole.

10. The mole fraction of toluene in vpor mixture is .....
    a) Y=0.1 b) Y= 0.99 c) Y= 0.0047 d) Y=0.9953
11. The vapor pressures P^o of toluene (C_7H_8) is.....mmHg
    a) P^o = 745.5 b) P^o = 353 c) P^o = 234.6 d) P^o = 342.6
12. The freezing point lowering of solution is.....°C.
    a) ΔT_f = 1.21 b) ΔT_f = 4.837 c) ΔT_f =0.663 d) ΔT_f = 6.163
13. The boiling point of solution is .....°C.
    a) T_b = 80.428 b) T_b = 0.328 c) T_b = -0.328 d) T_b= 79.772
14. The osmotic pressure of solution at equilibrium at 25 °C is .....atm.
    a) π= 0.2815 b) π= 1.825 c) π=0.1825 d) π= 2.815
15. Osmotic rise (height, h) of solution at equilibrium at 25 °C is .....m
    a) h= 3.23 b) h= 32.3 c) h= 3231 d) h= 323

For galvanic cell $Fe^{++} + Ag^+ \Longleftrightarrow Fe^{+++} + Ag$, where E^o = 0.77 volt for $Fe^{+++} + e^- \Longleftrightarrow Fe^{++}$, E^o_1 = 0.8 volt for $Ag^+ + e^- \Longleftrightarrow Ag$, T= 298 k , F=96500 coulombs/ mole electron and equimolar concentrations of Fe^{++} and Fe^{+++}.

16. The standard cell potential is .....
    a) E^o_{cell} = 0.03 V b) E^o_{cell}= 0.024 V c) E^o_{cell} = -0.03 V d) E^o_{cell} = - 0.024 V
17. The Concentration $[Ag^+]$ at equilibrium is .....
    a) $[Ag^+]$= 0.31 molar b) $[Ag^+]$= 0.431 molar c) $[Ag^+]$= 0.134 molar d) $[Ag^+]$= - 0.13 molar
18. The change in standard free energy is .....
    a) ΔG^o_r = 2895 joule b) ΔG^o_r = -5356 Joule c) ΔG^o_r =- 2895 Joule d) ΔG^o_r = 5356 joule
19. The equilibrium constant is .....
    a) K_{eq} =2.216 b) K_{eq} = 3.216 c) K_{eq} = 1.214 d) K_{eq} = 1.216
20. The cell potential at $[Ag^+]$ = 0.4 molar, and T= 298 k is .....
    a) E_{cell} = 0.0033 V b) E_{cell} = 0.0065 V c) E_{cell} = -0.0065 V d) E_{cell} = -0.0033 V

With our Best Regards and Good Luck

Prof. Dr. Mohamed Elhalwany **Dr. Mahamoud Hnafi**

You are given That: C=12, H=1, N=14, O=16 gm/mol

Engineering Mathematics and Physics Department
Faculty of Engineering, Mansoura University

Engineering Chemistry (BAS 041) | Final Term Exam (New Prog.) | **Model B**
Time : 2 hr. | 16 /1/2022 | Total marks: 50

Answer the following quistion

Question (1): Which of the following statements are True and which are false? (15 Marks)

1. The value of the Universal gas constant R = $8.314*10^{-3}$ k Joule/ mole K
2. The extent of nonideality of real gas can be seen by examining quantity (PV/RT) for one mole of the gas.
3. The maximum possible work that can be derived from a spontaneous process occurring at constant temperature and pressure is equal to the enthalpy.
4. Two factors that control the spontaneity of reactions are internal energy and enthalpy.
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You are given That: C=12, H=1, N=14, O=16 gm/mol

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13. The Concentration $[Ag^+]$ at equilibrium is .....
    a) $[Ag^+]$= 0.31 molar b) $[Ag^+]$= 0.431 molar c) $[Ag^+]$= 0.134 molar d) $[Ag^+]$= - 0.13 molar
14. The change in standard free energy is .....
    a) ΔG^o_r = 2895 joule b) ΔG^o_r = -5356 Joule c) ΔG^o_r = - 2895 Joule d) ΔG^o_r = 5356 joule
15. The equilibrium constant is .....
    a) K_{eq} =2.216 b) K_{eq}= 3.216 c) K_{eq}= 1.214 d) K_{eq}= 1.216
16. The cell potential at $[Ag^+]$ = 0.4 molar, and T= 298 k is .....
    a) E_{cell} = 0.0033 V b) E_{cell}= 0.0065 V c) E_{cell} = -0.0065 V d) E_{cell} = -0.0033 V

Air has a weight composition as, CO_2 = 0.44%, O_2 = 22.16%, H_2O=1.8% at 25 °C and 760 torr.?

17. The moles fraction of N_2 is .....
    a) Y = 0.356 b) Y =0.229 c) Y = 0.286 d) Y=0.771
18. The average molecular weight of air is .....gm/mol.
    a) M_w=28.55 b) M_w= 29.56 c) M_w= 30.1 d) M_w= 29.65
19. The density of air is .....mg/l
    a) ρ= 11.68 b) ρ =116.8 c) ρ = 1.168 d) ρ =1168
20. The partial pressure of H_2O is .....mmHg
    a) P= 0.2855 b) P =21.7 c) P = 0.255. d) P = 58.96

With our Best Regards and Good Luck

Prof. Dr. Mohamed Elhalwany **Dr. Mahamoud Hnafi**

You are given That: C=12, H=1, N=14, O=16 gm/mol

Engineering Mathematics and Physics Department
Faculty of Engineering, Mansoura University

Engineering Chemistry (BAS 041) | Final Term Exam (New Prog.) | **Model C**

Time : 2 hr. | 16 /1/2022 | Total marks: 50

Answer the following quistion

Question (1): Which of the following statements are True and which are false? (15 Marks)

1. The heat changing for a process carried out at constant volume, (Q_v), are equal to changing in enthalpy, (ΔH).
2. Enthalpy is a property relating internal energy and the product of pressure and volume.
3. The change in entropy for a process ΔS, depends only on the initial and final states of the system and not on the particular pathway by which it changes from one state to another.
4. The standard state for a gas is the hypothetical state in which the gas has any pressure and at specified temperature and the gas has an ideal behavior.
5. The Third law of thermodynamics state that The entropy of an element or a compound present in the form of a perfectly ordered crystal is greater than zero at the absolute zero of temperature
6. If other factors are held constant, any mixing process that results in a random mixing of molecules represents an increase in entropy.
7. For a system of fixed composition the change in its internal energy, (ΔE), may occur due to exchange of heat with the surroundings and Performance of work or one of them.
8. If you are increasing the solute concentration, the raise of a solution osmotic pressure occure.
9. The boiling point elevation of the solution is lower than that of the pure solvent.
10. The Henry's law constant is doubled if you double the partial pressure of a gas over a liquid at constant temperature.
11. The molality of a solution is the number of moles of the solute per kilogram of solvent contained in solution.
12. The freezing point of the solution (nonvolatile solute with a liquid solvent) is unchanged by addition of the solvent.
13. The reaction quotient is the ratio of product to reactant for non equilibrium activities or concentrations.
14. When an electrical field is applied to electrolyte solution, the positive ions will migrate toward the electrode with the negative charge, (anode).
15. Corrosion is defined as the reduction of metals by interaction with the environment.
16. Most materials occur in nature in the form of a hydroxide or oxide, and the metal is produced through reduction of the ore.
17. One method divides corrosion into low-pressure and high pressure corrosion.
18. Acid solutions containing dissolved oxygen will be less corrosive than air free acids.
19. Activation polarization refers to electro-chemical reaction, which are controlled by diffusion in the electrolyte.
20. Essentially, passivity refers to the loss of chemical activity experienced by certain metals and alloys under particular environmental condition.
21. For some metals and it's alloys, at very high concentrations of oxidizers, or in the presence of very powerful oxidizers, the corrosion rate again increases with increasing oxidizer power. This region is termed active region.
22. In a gas, the individual molecules are close together and are constantly in contact with neighbors.
23. Frequently, A substance exists in all three separate states of matter at the same time.
24. Collisions between molecules or between a molecule and an inert surface are perfectly plastic, with no change in the total kinetic energy of the gas molecules.
25. At constant temperature and volume, pressure is inversely proportional to the number of moles of gas.
26. The value of the Universal gas constant $R = 8.314*10^{-3}$ k Joule/ mole K
27. The extent of nonideality of real gas can be seen by examining quantity (PV/RT) for one mole of the gas.
28. The maximum possible work that can be derived from a spontaneous process occurring at constant temperature and pressure is equal to the enthalpy.
29. Two factors that control the spontaneity of reactions are internal energy and enthalpy.
30. ΔE and ΔH differ by the amount of work done by or in the system when it only contracts under the opposing pressure of the atmosphere.

You are given That: C=12, H=1, N=14, O=16 gm/mol

Question (2) Choose the correct answer for the following (35 Marks)

Air has a weight composition as, CO_2 = 0.44%, O_2 = 22.16%, H_2O=1.8% at 25 °C and 760 torr.?

1. The moles fraction of N_2 is .....
   a) Y = 0.356 b) Y =0.229 c) Y = 0.286 d) Y=0.771
2. The average molecular weight of air is .....gm/mol.
   a) M_w=28.55 b) M_w= 29.56 c) M_w= 30.1 d) M_w= 29.65
3. The density of air is .....mg/l
   a) ρ= 11.68 b) ρ =116.8 c) ρ = 1.168 d) ρ =1168
4. The partial pressure of H_2O is .....mmHg
   a) P= 0.2855 b) P =21.7 c) P = 0.255. d) P = 58.96

The temperature of 56 g nitrogen gas, (N_2) at a pressure of 1246.4 mmHg was raised to 327 °C at constant volume. The final pressssure was 1869.6 mmHg. Consider nitrogen behaves as an ideal gas during this process and the specific heat of nitrogen gas at constant pressure C_p = (6.5 +0.001T) cal/mole-k.

5. The number of moles of N_2 is .....
   a) n= 1 mole b) n=2.5 mole c) n=1.75 mole d) n=2 mole
6. The startng temperature is is .....
   a) T=400K b) T =300 K c) T =200 K d) T =600 K
7. The work done on the system is .....
   a) W=20.4 cal. b) W=160.4 cal. c) W= 0 cal. d) W=- 16.4 cal.
8. The heat changed (Q) is .....
   a) ΔQ= 1274 cal. b) ΔQ =2800 caf. c) ΔQ = -2800cal. d) ΔQ = -1274 cal.
9. The internal energy changed, is .....
   a) ΔE= 5290cal. b) ΔE= -2800 cal. c) ΔE= 2800 cal. d) ΔE= -5290.4cal.

An ideal solution of 4.6g toluene (C_7H_8) in 386.1g Benzene (C_6H_6) has a total vapor pressure 749 mmHg and density of 0.9 g/cm³. For benzene, the vapor pressures P° is 753 mmHg., $T°_b$ = 80.1 °C, $T°_f$ = 5.5 °C, K_b= 2.53 (deg. kg) /mole, K_f= 5.12 (deg. kg) /mole.

10. The mole fraction of toluene in vpor mixture is .....
    a) Y=0.1 b) Y= 0.99 c) Y= 0.0047 d) Y=0.9953
11. The vapor pressures P° of toluene (C_7H_8) is.....mmHg
    a) P° = 745.5 b) P° = 353 c) P° = 234.6 d) P° = 342.6
12. The freezing point lowering of solution is.....°C.
    a) ΔT_f = 1.21 b) ΔT_f = 4.837 c) ΔT_f =0.663 d) ΔT_f = 6.163
13. The boiling point of solution is .....°C.
    a) T_b = 80.428 b) T_b = 0.328 c) T_b = -0.328 d) T_b= 79.772
14. The osmotic pressure of solution at equilibrium at 25 °C is .....atm.
    a) π= 0.2815 b) π= 1.825 c) π=0.1825 d) π= 2.815
15. Osmotic rise (height, h) of solution at equilibrium at 25 °C is .....m
    a) h= 3.23 b) h= 32.3 c) h= 3231 d) h= 323

For galvanic cell $Fe^{++} + Ag^+ \Longleftrightarrow Fe^{+++} + Ag$, where E° = 0.77 volt for $Fe^{+++} + e^- \Longleftrightarrow Fe^{++}$, E° = 0.8 volt for $Ag^+ + e^- \Longleftrightarrow Ag$, T= 298 k , F=96500 coulombs/ mole electron and equimolar concentrations of Fe^{++} and Fe^{+++}.

16. The standard cell potential is .....
    a) $E°_{cell}$ = 0.03 V b) $E°_{cell}$= 0.024 V c) $E°_{cell}$ = -0.03 V d) $E°_{cell}$ = - 0.024 V
17. The Concentration $[Ag^+]$ at equilibrium is .....
    a) $[Ag^+]$= 0.31 molar b) $[Ag^+]$= 0.431 molar c) $[Ag^+]$= 0.134 molar d) $[Ag^+]$= - 0.13 molar
18. The change in standard free energy is .....
    a) $\Delta G°_r$ = 2895 joule b) $\Delta G°_r$ = -5356 Joule c) $\Delta G°_r$ = 2895 Joule d) $\Delta G°_r$ = 5356 joule
19. The equilibrium constant is .....
    a) K_{eq} =2.216 b) K_{eq} = 3.216 c) K_{eq} = 1.214 d) K_{eq} = 1.216
20. The cell potential at $[Ag^+]$ = 0.4 molar, and T= 298 k is .....
    a) E_{cell} = 0.0033 V b) E_{cell}= 0.0065 V c) E_{cell} = -0.0065 V d) E_{cell} = -0.0033 V

With our Best Regards and Good Luck

Prof. Dr. Mohamed Elhalwany **Dr. Mahamoud Hnafi**

You are given That: C=12, H=1, N=14, O=16 gm/mol

Mansoura University Faculty of Engineering BME Program Level 300 No. of pages: 3		3D Modeling in Fluid Flow and heat transfer MPE371 Time allowed: 2 hours Full Mark: 50 Marks	

Final Exam (18-1-2022) – First Semester

Attempt to answer all questions:

Question No. 1: **[10 marks]**

The governing equations of compressible fluid flow are:

$$\frac{\partial \rho}{\partial t} + \nabla.(\rho \vec{U}) = 0 \quad (1)$$

$$\frac{\partial(\rho u)}{\partial t} + \nabla.(\rho u \vec{U}) = -\frac{\partial p}{\partial x} + \nabla.(\mu \nabla u) + [s_{Mx}] + \rho g_x \quad (2)$$

$$\frac{\partial(\rho v)}{\partial t} + \nabla.(\rho v \vec{U}) = -\frac{\partial p}{\partial y} + \nabla.(\mu \nabla v) + [s_{My}] + \rho g_y \quad (3)$$

$$\frac{\partial(\rho w)}{\partial t} + \nabla.(\rho w \vec{U}) = -\frac{\partial p}{\partial z} + \nabla.(\mu \nabla w) + [s_{Mz}] + \rho g_z \quad (4)$$

$$\frac{\partial(C_v \rho T)}{\partial t} + \nabla.(C_v \rho T \vec{U}) = -p \nabla.\vec{U} + \nabla.(k \nabla T) + \Phi + S_t \quad (5)$$

i. Starting from the conservation of mass principle; derive the continuity equation. Illustrate your derivation with sketches. **[4 marks]**

ii. Starting from the conservation of mass principle, Newton's second law of motion, and the continuity equation; derive the left-hand side of the momentum equations. **[2 marks]**

iii. Derive the governing equations for steady incompressible flow in 2D using equations 1, 2, 3 and 4. Neglect body forces. Expand any divergence or gradient terms. Assume a constant coefficient of viscosity (μ). **[4 marks]**

Use the following definitions:

$$[s_{Mx}] = \left[\frac{\partial}{\partial x}\left(\mu \frac{\partial u}{\partial x} + \lambda \nabla.\vec{U}\right) + \frac{\partial}{\partial y}\left(\mu \frac{\partial v}{\partial x}\right) + \frac{\partial}{\partial z}\left(\mu \frac{\partial w}{\partial x}\right)\right]$$

$$[s_{My}] = \left[\frac{\partial}{\partial x}\left(\mu \frac{\partial u}{\partial y}\right) + \frac{\partial}{\partial y}\left(\mu \frac{\partial v}{\partial y} + \lambda \nabla.\vec{U}\right) + \frac{\partial}{\partial z}\left(\mu \frac{\partial w}{\partial y}\right)\right]$$

$$[s_{Mz}] = \left[\frac{\partial}{\partial x}\left(\mu \frac{\partial u}{\partial z}\right) + \frac{\partial}{\partial y}\left(\mu \frac{\partial v}{\partial z}\right) + \frac{\partial}{\partial z}\left(\mu \frac{\partial w}{\partial z} + \lambda \nabla.\vec{U}\right)\right]$$

Question No. 2: **[15 marks]**

The following equation describes the transport of the variable ϕ

$$\frac{\partial(\rho \phi)}{\partial t} + \nabla.(\rho \phi \vec{U}) = \nabla.(\Gamma \nabla \phi) + S_\phi$$

i. Simplify the equation to model a source-free one-dimensional steady diffusion in the x-direction. **[2 marks]**

ii. Using the finite volume method, convert the model to a system of algebraic equations. Use the variables $\phi_0 = 50$ and $\phi_L = 100$ to express Dirichlet boundary conditions. Illustrate your derivation with relevant sketches. **[9 marks]**

iii. Write the system of algebraic equations for a uniform mesh consisting of 5 finite volumes. Write the system in the matrix form. What is the type of the coefficients' matrix? **[4 marks]**

Question No. 3 (Choose the correct answer): **[5 marks]**

i. For a convective-diffusion problem solved with central scheme method, if the coefficients array is $\begin{bmatrix} 1 & -1 & 0 \\ -0.25 & 1 & 0.5 \\ 0 & -1 & 1 \end{bmatrix}$, the solution is: ----------
A) numerically stable.
B) numerically unstable.
C) diverged.
D) unsolvable.

ii. For a convective-diffusion problem solved with upwind scheme, the solution is: ----------
A) always stable.
B) always unstable.
C) needs a stability test
D) unsolvable.

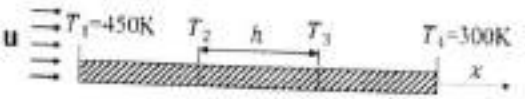
iii. For a 1-D unsteady heat conduction problem with a solution of $\rho c \frac{(T_0^{new} - T_0^{old})}{\Delta t} \Delta x = \omega \sum k \frac{\Delta T_s^{new}}{\Delta x} + (1-\omega) \sum k \frac{\Delta T_s^{old}}{\Delta x} + q_v \Delta x$, a fully implicit scheme can be obtained if:
A) $\omega = 0$.
B) $\omega = 1$.
C) $0 < \omega < 1$.
D) $\omega = 0.5$.

iv. For a 1-D unsteady heat conduction problem solved using an explicit scheme with $\Delta x = 0.004$ m, $k = 40$ W/m. K, $\rho^*C = 5e7$ J/m^3. K , if the time step equals 5 s, the solution is:-------
A) numerically stable.
B) numerically unstable.
C) diverged.
D) unsolvable.

v. For a 1-D unsteady heat conduction problem solved using Crank-Nicolson scheme with $\Delta x = 0.004$ m, $k = 40$ W/m. K, $\rho^*C = 5e7$ J/m^3. K , to obtain a stable solution, Δt should be $\leq$ ---- seconds.
A) 5.
B) 10.
C) 20.
D) 40.

Question No. 4: **[10 marks]**

For the 1-dimensional steady heat conduction/convection system shown in the following figure, if air moves with a constant velocity of $u = 0.01\ m/s$ in the upstream direction:



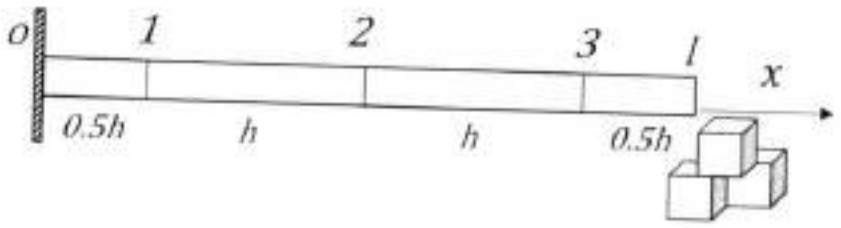
i. Use finite volume approach to find 2 equations that relate T_2 and T_3 to the temperatures at the boundaries, thermal conductivity, and h. Use central scheme method to deal with the convection term. **[6 marks]**

ii. Find the solutions' coefficients array. **[2 marks]**

iii. Calculate T_2 and T_3. (h = 0.001 m, k = 0.3 kW/m. K, ρ*C = 1e6 J/m^3. K). **[2 marks]**

Question No. 5: **[10 marks]**

For the 1-dimensional unsteady heat conduction system shown in the following figure; if the initial temperature of the rod equals 200 °C, and the rod is thermally insulated from one end (o), while the other end (l) is kept at a constant temperature of 0 °C throughout the experiment:



i. Use finite volume approach and fully implicit scheme to find the equations that describe the temperature distribution along the rod. **[6 marks]**

ii. Using the values (h = 0.004 m, k = 10 W/m. K, ρ*C = 1e7 J/m^3. K, Δt = 5 seconds), calculate the temperature distribution after 10 seconds. **[4 marks]**

With our best wishes
Dr. Yahia Fouda
Dr. Mohamed Sameh

	Mansoura University Fac. of Engineering BME Program Level 200 (3 pages exam)		Stress Analysis PDE 281 Time allowed :2 hours Full Mark:50 Marks	

Final Exam (2021-2022) – First Semester - Model (1)

Solve the following questions 'a stitch in time saves nine'

Q.1 (16 mark)

At a point strains measured with rectangular rosettes are ε_a = 600 microns, ε_b =300 microns and ε_c = −200 micron. Taking E = 2×10^5 Mpa and ν = 0.3.

1. The maximum principle strain is ..... mieron
   (a) 612.31 (b) 613.26 (c) 620.23 (d) 623.20
2. The minimum principle strain is ..... micron
   (a) -223.22 (b) -213.23 (c) -220.30 (d) -212.31
3. The maximum principle stress is ..... Mpa
   (a) 102.57 (b) 107.52 (c) 120.57 (d) 100.75
4. The minimum principle stress is ..... Mpa
   (a) -6.92 (b) -6.29 (c) -9.62 (d) -9.26
5. The maximum shear strain in the x-y plane is ..... micron
   (a) 214.75 (b) 169.03 (c) 412.31 (d) 196.03
6. The absolute maximum shear stress is ..... Mpa
   (a) 36.74 (b) 63.43 (c) 54.74 (d) 54.43
7. The bulk modulus of that material is ..... GPa
   (a) 166.66 (b) 616.66 (c) 111.66 (d) 161.66
8. The change in unit volume is ..... micron
   (a) 600 (b) - 600 (c) - 400 (d) 400

Q.2 (18 mark)

The state of stress at a point in a strained material is as shown in Figure (1). Taking E = 80×10^3 Mpa, G = 50×10^3 Mpa and ν = 0.33.

9. The maximum principle stress is ..... Mpa.
   (a) 287.08 (b) 280.78 (c) 270.87 (d) 278.08
10. The minimum principle stress is ..... Mpa.
    (a) 91.71 (b) 71.91 (c) 97.7 (d) 79.19
11. The direction of maximum principle stress is .....
    (a) 37.98° (b) 73.89° (c) 79.83° (d) 89.38°
12. The maximum principle strain is ..... mm.
    (a) 0.00317 (b) 0.00713 (c) 0.0317 (d) 0.0713

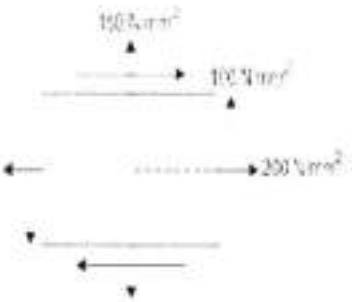


Figure (1)

13. The pure shear can be attained in this element if .....
    (a) $\sigma_x = -\sigma_y$ (b) $\sigma_x = \sigma_y = 0$ (c) a,b are right (d) a,b,c are wrong

14. The maximum principle shear stress in the given plane is ..... Mpa

(a) 100.30 (b) 108.03 (c) 105.38 (d) 103.08

15. The normal strain in the x-direction is .....mm

(a) 0.0188 (b) 0.0811 (c) 0.00188 (d) 0.00811

16. The normal strain in the y-direction is .....mm

(a) 0.0105 (b) 0.0501 (c) 0.00501 (d) 0.00105

17. The shear strain γ_{xy} in the given plane is ..... Micron.

(a) 1250 (b) 1502 (c) 1052 (d) 1025

Q.3 (12 mark)

A 400 mm by 300 mm rectangle DABC is drawn on a thin plate the deformed geometry is shown by the dashed lines shown in Figure (2). Taking E = 200× 10^3 Mpa, G = 80 × 10^3 MPa

18. The normal strain ε_x is ..... mm.

(a) 7.5×10^{-3} (b) 5.7×10^{-2} (c) 5.5×10^{-3} (d) 7.15×10^{-2}

19. The normal strain ε_y is ..... mm.

(a) 66.6×10^{-2} (b) 66.6×10^{-2} (c) 6.00×10^{-3} (d) 66.66×10^{-4}

20. The shear strain γ_{xy} is ..... mm.

(a) 0.1160 (b) 0.0116 (c) 0.0611 (d) 0.0016

21. The maximum principle normal strain is ..... mm.

(a) 0.0218 (b) 0.0125 (c) 0.0812 (d) 0.0821

22. The Poisson's ratio ν for that material is .....

(a) 0.25 (b) 0.025 (c) 0.205 (d) 0.052

Figure (2)

23. The minimum principle normal strain is ..... micron.

(a) 5.616 (b) 6.616 (c) 2.16 (d) 6.165

Q.4 (4 mark)

A rectangular steel bar of 25 mm x 12 mm cross-section deflects 6 mm when simply supported on its 25-mm face over a span of 1.2 m and loaded at the center with a concentrated load of 126 N. If Poisson's ratio for the material is 0.28.

24. The modulus of elasticity is ..... GPa

(a) 205 (b) 203 (c) 200 (d) 210

25. The bulk modulus for that material is ..... GPa

(a) 195.05 (b) 159.09 (c) 591.09 (d) 951.05

You are allowed to use these equations:

$$\sigma_{x1} = \frac{\sigma_x+\sigma_y}{2} + \frac{\sigma_x-\sigma_y}{2}\cos(2\theta) - \tau_{xy}\sin(2\theta)$$

$$\tau_{x1y1} = -\frac{\sigma_x-\sigma_y}{2}\sin(2\theta) + \tau_{xy}\cos(2\theta)$$

$$\sigma_{y1} = \frac{\sigma_x+\sigma_y}{2} - \frac{\sigma_x-\sigma_y}{2}\cos(2\theta) - \tau_{xy}\sin(2\theta)$$

$$\tan(2\theta_p) = \frac{2\tau_{xy}}{\sigma_x-\sigma_y}$$

$$\sigma_{1,2} = \frac{\sigma_x+\sigma_y}{2} \pm \sqrt{(\frac{\sigma_x-\sigma_y}{2})^2 + (\tau_{xy})^2}$$

$$\tan(2\theta_s) = \frac{\sigma_x-\sigma_y}{-2\tau_{xy}}$$

$$\tau_{1,2} = \pm\sqrt{(\frac{\sigma_x-\sigma_y}{2})^2 - (\tau_{xy})^2}$$

$$\tau_{max} = \frac{\sigma_1-\sigma_3}{2}$$

$$\sigma^3{}_p - I_1\sigma^2{}_p + I_2\sigma_p - I_3 = 0$$

$$I_1 = \sigma_x + \sigma_y - \sigma_z$$

$$I_2 = \sigma_x\sigma_y + \sigma_x\sigma_z + \sigma_y\sigma_z - \tau^2{}_{xy} - \tau^2{}_{yz} - \tau^2{}_{xz}$$

$$det\begin{bmatrix}\sigma_x & \tau_{xy} & \tau_{xz}\\ \tau_{yx} & \sigma_y & \tau_{yz}\\ \tau_{zx} & \tau_{zy} & \sigma_z\end{bmatrix} I_3 =$$

$$a_i = \begin{bmatrix}(\sigma_y-\sigma_i) & \tau_{yz}\\ \tau_{yz} & (\sigma_z-\sigma_i)\end{bmatrix}$$

$$b_i = -\begin{bmatrix}(\tau_{xy}) & \tau_{yz}\\ \tau_{xz} & (\sigma_z-\sigma_i)\end{bmatrix}$$

$$c_i = \begin{bmatrix}\tau_{xy} & (\sigma_y-\sigma_i)\\ \tau_{xz} & \tau_{yz}\end{bmatrix}$$

$$k_i = \frac{1}{(a^2{}_i + b^2{}_i + c^2{}_i)^{1/2}}$$

$$\gamma_{1,2} = \pm\sqrt{(\frac{\varepsilon_x-\varepsilon_y}{2})^2 - (\frac{\gamma_{xy}}{2})^2}$$

$$\gamma_{max} = \varepsilon_1 - \varepsilon_3$$

$$\sigma_{x1} = \sigma_x.l^2{}_1 + \sigma_y.m^2{}_1 + \sigma_z.n^2{}_1 + 2(\tau_{xy}l_1m_1 + \tau_{yz}m_1n_1 + \tau_{xz}l_1n_1) \quad , \quad \Delta V = \varepsilon.V$$

$$\sigma_{y1} = \sigma_x.l^2{}_2 + \sigma_y.m^2{}_2 + \sigma_z.n^2{}_2 + 2(\tau_{xy}l_2m_2 + \tau_{yz}m_2n_2 + \tau_{xz}l_2n_2)$$

$$\sigma_{z1} = \sigma_x.l^2{}_3 + \sigma_y.m^2{}_3 + \sigma_z.n^2{}_3 + 2(\tau_{xy}l_3m_3 + \tau_{yz}m_3n_3 + \tau_{xz}l_3n_3)$$

$$\tau_{x1y1} = \sigma_x l_1l_2 + \sigma_y m_1m_2 + \sigma_z n_1n_2 + \tau_{xy}(l_1m_2 + l_2m_1) + \tau_{yz}(m_1n_2 + n_1m_2) + \tau_{xz}(n_1l_2 + l_1n_2)$$

$$\tau_{x1z1} = \sigma_x l_1l_3 + \sigma_y m_1m_3 + \sigma_z n_1n_3 + \tau_{xy}(l_1m_3 + l_3m_1) + \tau_{yz}(m_1n_3 + n_1m_3) + \tau_{xz}(n_1l_3 + l_1n_3)$$

$$\delta = \frac{FL^3}{3EI}$$

$$\delta = \frac{FL^3}{48\,EI}$$

$$\delta = \frac{FL}{AE}$$

$$G = \frac{\tau_{xy}}{\gamma_{xy}}$$

$$E = 2G(1+\nu)$$

$$K = \frac{E}{3(1-2\nu)}$$

$$\varepsilon_x = \frac{\sigma_x}{E} - \nu\frac{\sigma_y}{E} - \nu\frac{\sigma_z}{E}$$

$$\varepsilon_y = \frac{\sigma_y}{E} - \nu\frac{\sigma_x}{E} - \nu\frac{\sigma_z}{E}$$

$$\varepsilon_z = \frac{\sigma_z}{E} - \nu\frac{\sigma_x}{E} - \nu\frac{\sigma_y}{E}$$

$$\varepsilon_1 = \frac{\sigma_1}{E} - \nu\frac{\sigma_2}{E} - \nu\frac{\sigma_3}{E}$$

$$\varepsilon_2 = \frac{\sigma_2}{E} - \nu\frac{\sigma_1}{E} - \nu\frac{\sigma_3}{E}$$

$$\sigma_x = \frac{E}{1-\nu^2}(\varepsilon_x + \nu\varepsilon_y + \nu\varepsilon_z)$$

$$\sigma_y = \frac{E}{1-\nu^2}(\varepsilon_y + \nu\varepsilon_x + \nu\varepsilon_z)$$

$$\sigma_z = \frac{E}{1-\nu^2}(\varepsilon_z + \nu\varepsilon_x + \nu\varepsilon_y)$$

$$\sigma_1 = \frac{E}{1-\nu^2}(\varepsilon_1 + \nu\varepsilon_2 + \nu\varepsilon_3)$$

$$\sigma_2 = \frac{E}{1-\nu^2}(\varepsilon_2 + \nu\varepsilon_1 + \nu\varepsilon_3)$$

$$\sigma_3 = \frac{E}{1-\nu^2}(\varepsilon_3 + \nu\varepsilon_1 + \nu\varepsilon_2)$$

$$\varepsilon_a = \varepsilon_x\cos\theta_a{}^2 + \varepsilon_y\sin\theta_a{}^2 + \gamma_{xy}\sin\theta_a\cos\theta_a$$

$$e = J_1 = \varepsilon_x + \varepsilon_y + \varepsilon_z \quad , \quad \varepsilon_x = \frac{v_B-v_A}{\Delta x} \quad , \quad \varepsilon_y = \frac{v_D-v_A}{\Delta y} \quad , \quad \gamma_{xy} = \frac{v_B-v_A}{\Delta x} + \frac{v_D-v_A}{\Delta y}$$

Dr.Fatma Elerian
Best wishes

	Mansoura University Fac. of Engineering BME Program Level 200 (3 pages exam)		Stress Analysis PDE 281 Time allowed :2 hours Full Mark:50 Marks	

Final Exam (2021-2022) – First Semester - Model (2)

Solve the following questions 'a stitch in time saves nine'

Q.1 (4 mark)

A rectangular steel bar of 25 mm x 12 mm cross-section deflects 6 mm when simply supported on its 25-mm face over a span of 1.2 m and loaded at the center with a concentrated load of 126 N. If Poisson's ratio for the material is 0.28.

1. The modulus of elasticity is ..... GPa
   (a) 205 (b) 203 (c) 200 (d) 210
2. The bulk modulus for that material is ..... GPa
   (a) 195.05 (b) 159.09 (c) 591.09 (d) 951.05

Q.2 (16 mark)

At a point strains measured with rectangular rosettes are ε_a = 600 microns, ε_b =300 microns and ε_c = – 200 micron. Taking E = 2×10^5 Mpa and $\nu = 0.3$.

3. The maximum principle strain is ..... micron
   (a) 612.31 (b) 613.26 (c) 620.23 (d) 623.20
4. The maximum shear strain in the x-y plane is ..... micron
   (a) 214.75 (b) 169.03 (c) 412.31 (d) 196.03
5. The absolute maximum shear stress is ..... Mpa
   (a) 36.74 (b) 63.43 (c) 54.74 (d) 54.43
6. The bulk modulus of that material is ..... GPa
   (a) 166.66 (b) 616.66 (c) 111.66 (d) 161.66
7. The minimum principle strain is ..... micron
   (a) -223.22 (b) -213.23 (c) -220.30 (d) -212.31
8. The maximum principle stress is ..... Mpa
   (a) 102.57 (b) 107.52 (c) 120.57 (d) 100.75
9. The minimum principle stress is ..... Mpa
   (a) -6.92 (b) -6.29 (c) -9.62 (d) -9.26
10. The change in unit volume is ..... micron
    (a) 600 (b) - 600 (c) - 400 (d) 400

Q.3 (18 mark)

The state of stress at a point in a strained material is as shown in Figure (1). Taking E = 80×10^3 Mpa, G = 50×10^3 Mpa and $\nu = 0.33$

11. The maximum principle strain is ..... mm.
    (a) 0.00317 (b) 0.00713 (c) 0.0317 (d) 0.0713
12. The maximum principle stress is ..... Mpa.
    (a) 287.08 (b) 280.78 (c) 270.87 (d) 278.08

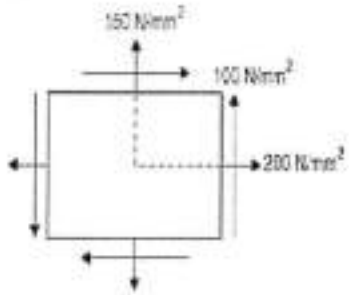


Figure (1)

Mansoura University Fac. of Engineering BME Program Level 200 (3 pages exam)		Stress Analysis PDE 281 Time allowed :2 hours Full Mark:50 Marks	

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Solve the following questions 'a stitch in time saves nine'

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1. The modulus of elasticity is ..... GPa
   (a) 205 (b) 203 (c) 200 (d) 210
2. The bulk modulus for that material is ..... GPa
   (a) 195.05 (b) 159.09 (c) 591.09 (d) 951.05

Q.2 (16 mark)

At a point strains measured with rectangular rosettes are ε_a = 600 microns, ε_b =300 microns and ε_c = – 200 micron. Taking E = 2×10^5 Mpa and ν = 0.3.

3. The maximum principle strain is ..... micron
   (a) 612.31 (b) 613.26 (c) 620.23 (d) 623.20
4. The maximum shear strain in the x-y plane is ..... micron
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5. The absolute maximum shear stress is ..... Mpa
   (a) 36.74 (b) 63.43 (c) 54.74 (d) 54.43
6. The bulk modulus of that material is ..... GPa
   (a) 166.66 (b) 616.66 (c) 111.66 (d) 161.66
7. The minimum principle strain is ..... micron
   (a) -223.22 (b) -213.23 (c) -220.30 (d) -212.31
8. The maximum principle stress is ..... Mpa
   (a) 102.57 (b) 107.52 (c) 120.57 (d) 100.75
9. The minimum principle stress is ..... Mpa
   (a) -6.92 (b) -6.29 (c) -9.62 (d) -9.26
10. The change in unit volume is ..... micron
    (a) 600 (b) - 600 (c) - 400 (d) 400

Q.3 (18 mark)

The state of stress at a point in a strained material is as shown in Figure (1). Taking E = 80×10^3 Mpa, G = 50×10^3 Mpa and ν = 0.33

11. The maximum principle strain is ..... mm.
    (a) 0.00317 (b) 0.00713 (c) 0.0317 (d) 0.0713
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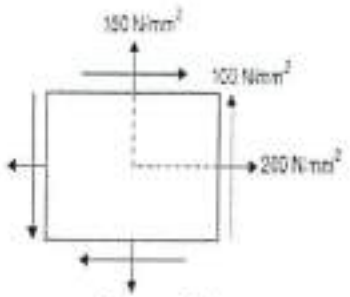

Figure (1)

You are allowed to use these equations:

$$\sigma_{x1} = \frac{\sigma_x+\sigma_y}{2} + \frac{\sigma_x-\sigma_y}{2}\cos(2\theta) + \tau_{xy}\sin(2\theta)$$

$$\tau_{x1y1} = -\frac{\sigma_x-\sigma_y}{2}\sin(2\theta) + \tau_{xy}\cos(2\theta)$$

$$\sigma_{y1} = \frac{\sigma_x+\sigma_y}{2} - \frac{\sigma_x-\sigma_y}{2}\cos(2\theta) - \tau_{xy}\sin(2\theta)$$

$$tan(2\theta_p) = \frac{2\tau_{xy}}{\sigma_x-\sigma_y}$$

$$\sigma_{1,2} = \frac{\sigma_x+\sigma_y}{2} \pm \sqrt{(\frac{\sigma_x-\sigma_y}{2})^2 + (\tau_{xy})^2}$$

$$tan(2\theta_s) = \frac{\sigma_x-\sigma_y}{-2\tau_{xy}}$$

$$\tau_{1,2} = \pm\sqrt{(\frac{\sigma_x-\sigma_y}{2})^2 + (\tau_{xy})^2}$$

$$\tau_{max} = \frac{\sigma_1-\sigma_3}{2}$$

$$\sigma^3{}_p - I_1\sigma^2{}_p + I_2\sigma_p - I_3 = 0$$

$$I_1 = \sigma_x + \sigma_y + \sigma_z$$

$$I_2 = \sigma_x\sigma_y + \sigma_x\sigma_z + \sigma_y\sigma_z - \tau^2{}_{xy} - \tau^2{}_{yz} - \tau^2{}_{xz}$$

$$det\begin{bmatrix}\sigma_x & \tau_{xy} & \tau_{xz}\\ \tau_{yx} & \sigma_y & \tau_{yz}\\ \tau_{zx} & \tau_{zy} & \sigma_z\end{bmatrix} I_3 =$$

$$a_i = \begin{bmatrix}(\sigma_y-\sigma_i) & \tau_{yz}\\ \tau_{yz} & (\sigma_z-\sigma_i)\end{bmatrix}$$

$$b_i = -\begin{bmatrix}(\tau_{xy}) & \tau_{yz}\\ \tau_{xz} & (\sigma_z-\sigma_i)\end{bmatrix}$$

$$c_i = \begin{bmatrix}\tau_{xy} & (\sigma_y-\sigma_i)\\ \tau_{xz} & \tau_{yz}\end{bmatrix}$$

$$k_i = \frac{1}{(a^2{}_i + b^2{}_{i+}c^2{}_i)^{1/2}}$$

$$\gamma_{1,2} = \pm\sqrt{(\frac{\varepsilon_x-\varepsilon_y}{2})^2 + (\frac{\gamma_{xy}}{2})^2}$$

$$\gamma_{max} = \varepsilon_1 - \varepsilon_3$$

$$\sigma_{x1} = \sigma_x.l^2{}_1 + \sigma_y.m^2{}_1 + \sigma_z.n^2{}_1 + 2(\tau_{xy}l_1m_1 + \tau_{yz}m_1n_1 + \tau_{xz}l_1n_1) \quad , \quad \Delta V = e.V$$

$$\sigma_{y1} = \sigma_x.l^2{}_2 + \sigma_y.m^2{}_2 + \sigma_z.n^2{}_2 + 2(\tau_{xy}l_2m_2 + \tau_{yz}m_2n_2 + \tau_{xz}l_2n_2)$$

$$\sigma_{z1} = \sigma_x.l^2{}_3 + \sigma_y.m^2{}_3 + \sigma_z.n^2{}_3 + 2(\tau_{xy}l_3m_3 + \tau_{yz}m_3n_3 + \tau_{xz}l_3n_3)$$

$$\tau_{x1y1} = \sigma_x l_1l_2 + \sigma_y m_1m_2 + \sigma_z n_1n_2 + \tau_{xy}(l_1m_2 + l_2m_1) + \tau_{yz}(m_1n_2 + n_1m_2) + \tau_{xz}(n_1l_2 + l_1n_2)$$

$$\tau_{x1z1} = \sigma_x l_1l_3 + \sigma_y m_1m_3 + \sigma_z n_1n_3 + \tau_{xy}(l_1m_3 + l_3m_1) + \tau_{yz}(m_1n_3 + n_1m_3) + \tau_{xz}(n_1l_3 + l_1n_3)$$

$$\delta = \frac{FL^3}{3EI}$$

$$\delta = \frac{FL^3}{48\,EI}$$

$$\delta = \frac{FL}{AE}$$

$$G = \frac{\tau_{xy}}{\gamma_{xy}}$$

$$E = 2G(1+\nu)$$

$$K = \frac{E}{3(1-2\nu)}$$

$$\varepsilon_x = \frac{\sigma_x}{E} - \nu\frac{\sigma_y}{E} - \nu\frac{\sigma_z}{E}$$

$$\varepsilon_y = \frac{\sigma_y}{E} - \nu\frac{\sigma_x}{E} - \nu\frac{\sigma_z}{E}$$

$$\varepsilon_z = \frac{\sigma_z}{E} - \nu\frac{\sigma_x}{E} - \nu\frac{\sigma_y}{E}$$

$$\varepsilon_1 = \frac{\sigma_1}{E} - \nu\frac{\sigma_2}{E} - \nu\frac{\sigma_3}{E}$$

$$\varepsilon_2 = \frac{\sigma_2}{E} - \nu\frac{\sigma_1}{E} - \nu\frac{\sigma_3}{E}$$

$$\sigma_x = \frac{E}{1-\nu^2}(\varepsilon_x + \nu\varepsilon_y + \nu\varepsilon_z)$$

$$\sigma_y = \frac{E}{1-\nu^2}(\varepsilon_y + \nu\varepsilon_x + \nu\varepsilon_z)$$

$$\sigma_z = \frac{E}{1-\nu^2}(\varepsilon_z + \nu\varepsilon_x + \nu\varepsilon_y)$$

$$\sigma_1 = \frac{E}{1-\nu^2}(\varepsilon_1 + \nu\varepsilon_2 + \nu\varepsilon_3)$$

$$\sigma_2 = \frac{E}{1-\nu^2}(\varepsilon_2 + \nu\varepsilon_1 + \nu\varepsilon_3)$$

$$\sigma_3 = \frac{E}{1-\nu^2}(\varepsilon_3 + \nu\varepsilon_1 + \nu\varepsilon_2)$$

$$\varepsilon_a = \varepsilon_x\cos\theta_a{}^2 + \varepsilon_y\sin\theta_a{}^2 + \gamma_{xy}\sin\theta_a\cos\theta_a$$

$$e = J_1 = \varepsilon_x + \varepsilon_y + \varepsilon_z \quad , \quad \varepsilon_x = \frac{U_B-U_A}{\Delta x} \quad , \quad \varepsilon_y = \frac{V_D-V_A}{\Delta y} \quad , \quad \gamma_{xy} = \frac{V_B-V_A}{\Delta x} + \frac{U_D-U_A}{\Delta y}$$

Dr.Fatma Elerian
Best wishes

Mansoura University Faculty of Engineering BME Specific Program\ Self-study Exam		Electronics (2) Course code: ECE264 Time : 120 minutes Full Mark : 50 Marks

1st semester Final Exam : 25-1-2022 - Self-study Exam

Assume Any Missing Data and try to type Clear Answers

1- For the Circuit Shown in Figure (1); using re-model : find the voltage gain , current gain , input impedance , output impedance , and obtain if there is a phase shift. [10 Marks]

2- For the circuit shown in Figure (2); find the voltage gain, current gain, input impedance, output impedance, and obtain if there is a phase shift between i/p and o/p [10 Marks]

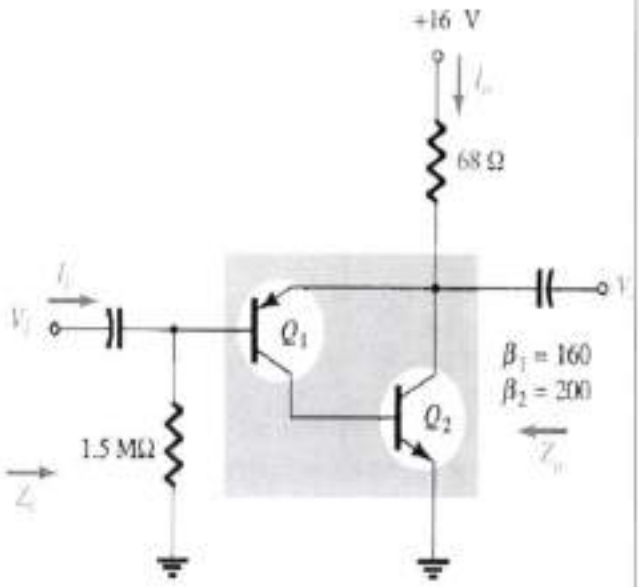

Figure (2)

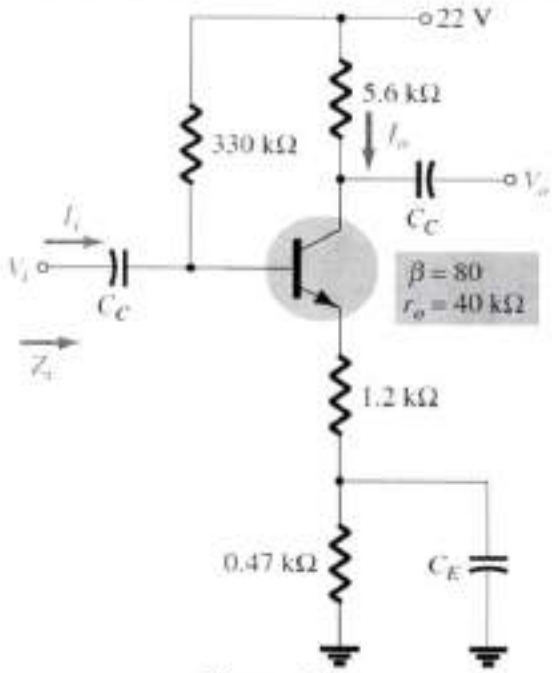

Figure (1)

3- For the Op-Amp. shown in Figure(3); (a) Using Golden rules; find the mathematical expression which describe the relation between Vo and Vi (b) Describe the operation of this circuit (c) State the main characteristics of the Operational Amplifier [10 Marks]

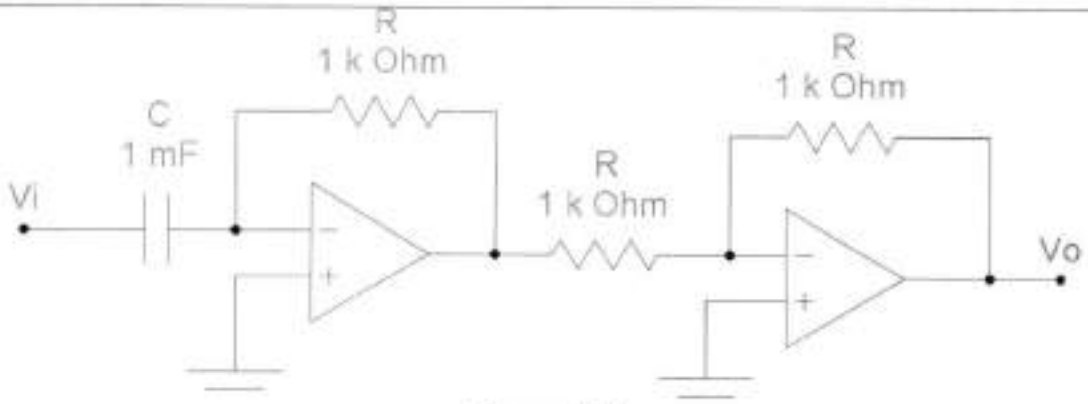

Figure (3)

4- For the Circuit shown in figure (1); Find: Voltage Gain (Av), Current Gain (AI), Input Impedance (Zi), Output Impedance (Zo), and obtain if there is a phase shift. hie=1, hfe=30 , rd=10kΩ, and μ=20 [10 Marks]

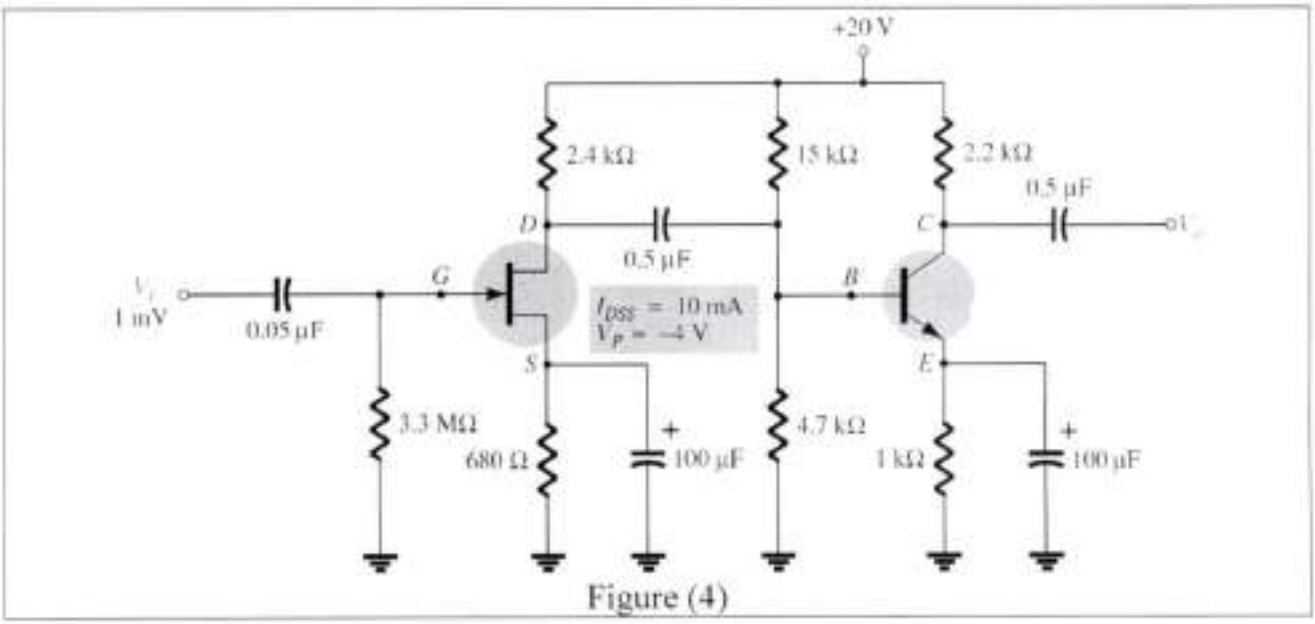

Figure (4)

5- For the Circuit Shown in Figure (5) using R_{sig}=270KΩ, R_1=R_2=2.7MΩ, R_d=R_s=2.7KΩ, R_L=4.7MΩ, I_{DSS}=12mA, V_p=-4v, r_d=10kΩ, V_{dd}=16v μ=20; find voltage gain , current gain , input impedance , output impedance , and obtain whether there is a phase shift or not [10 Marks]

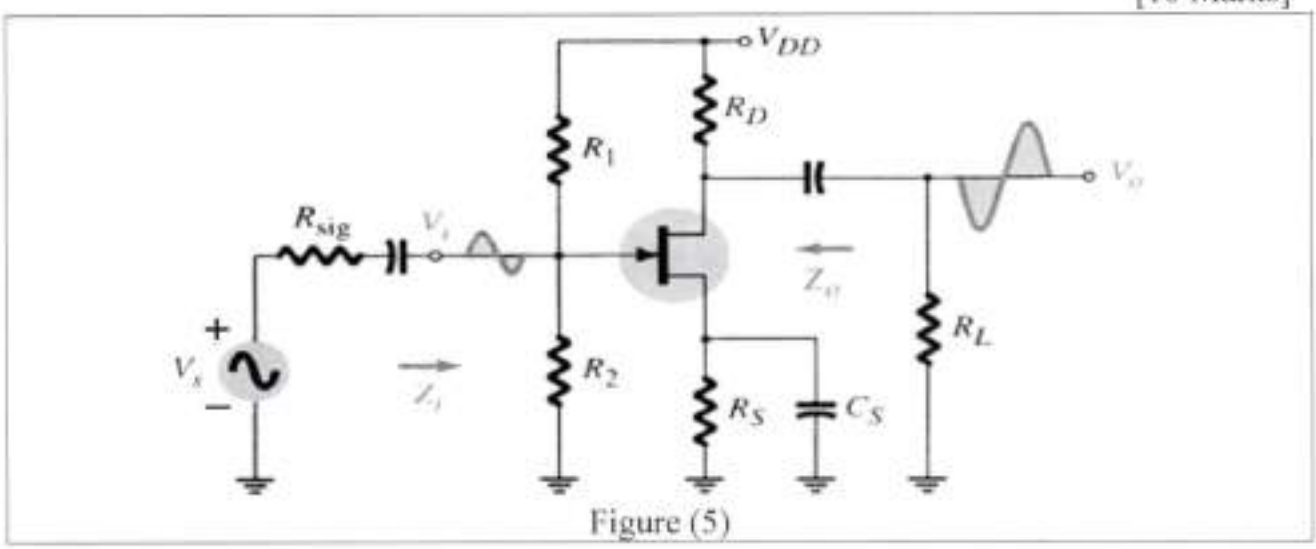

Figure (5)

With all of my best wishes

Ehab H. Abdelhay

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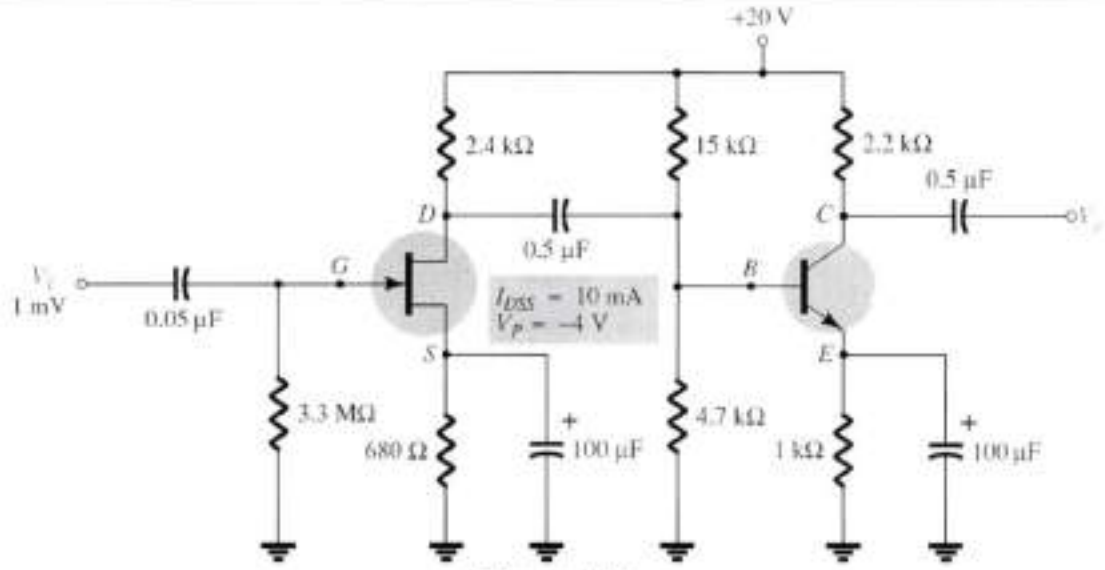

Figure (4)

5- For the Circuit Shown in Figure (5) using R_{sig}=270KΩ, R_1=R_2=2.7MΩ, R_d=R_s=2.7KΩ, R_L=4.7MΩ, I_{DSS}=12mA, V_p=-4v, r_d=10kΩ, V_{dd}=16v μ=20; find voltage gain , current gain , input impedance , output impedance , and obtain whether there is a phase shift or not [10 Marks]

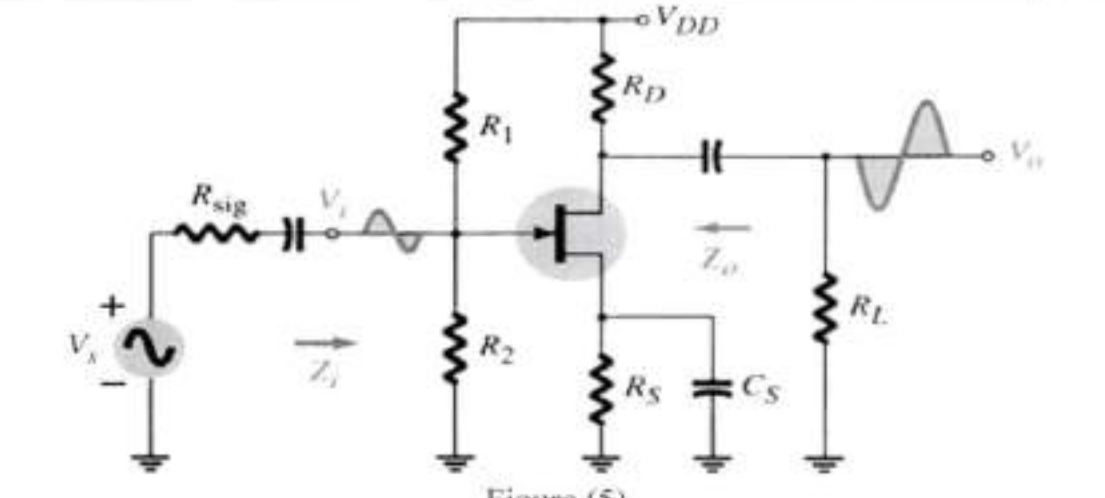

Figure (5)

With all of my best wishes

Ehab H. Abdelhay

Mansoura University Faculty of Engineering BME Specific Program\ Self-study Exam		Electronics (2) Course code: ECE264 Time : 120 minutes Full Mark : 50 Marks

1st semester Final Exam : 25-1-2022 - Self-study Exam

Assume Any Missing Data and try to type Clear Answers

1- For the Circuit Shown in Figure (1); using re-model : find the voltage gain , current gain , input impedance , output impedance , and obtain if there is a phase shift. [10 Marks]

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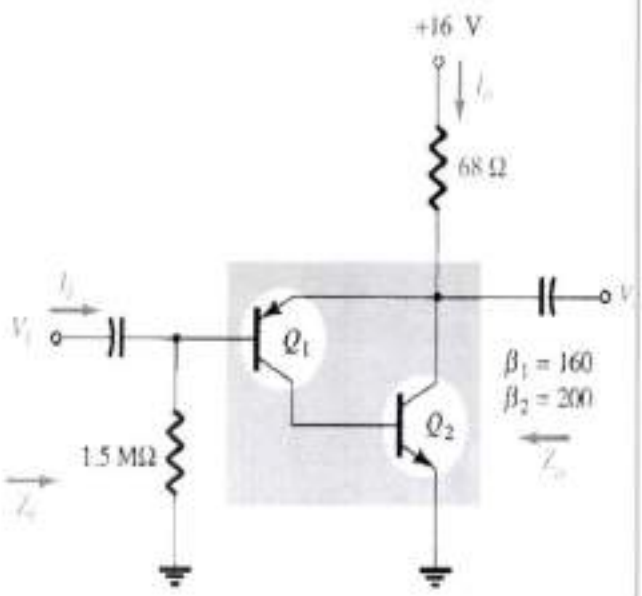

Figure (2)

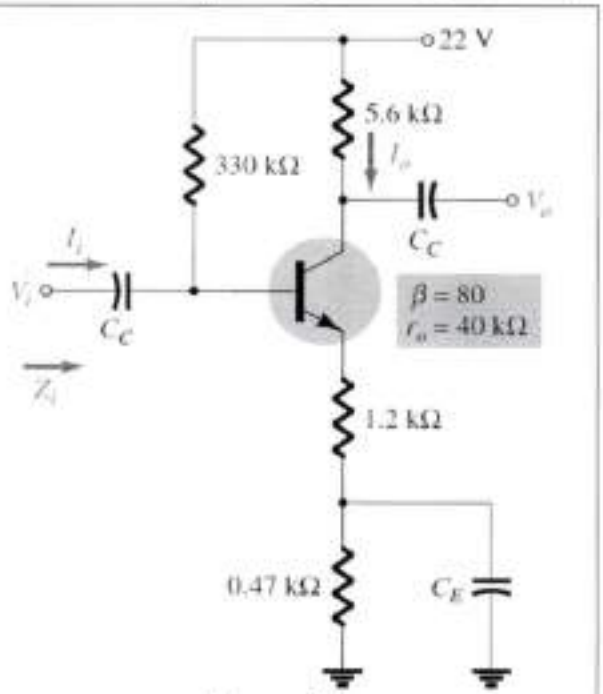

Figure (1)

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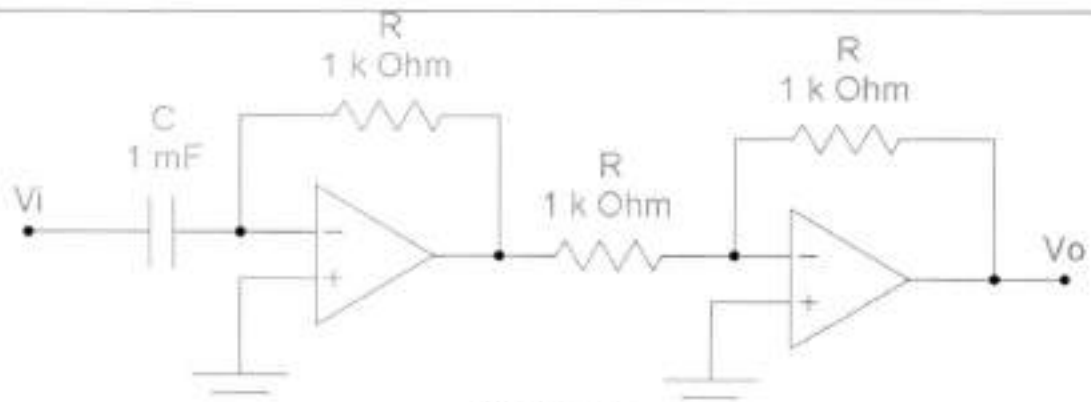


Figure (3)

Mansoura University
Faculty of Engineering
BME Prog. Final Exam. نموذج رقم2
Full mark 50.

Time: 2 H.
Course title: Electronics 1
Date: 25-1-2022

ANSWER ALL QUESTIONS

Question One: (12 MARKS)

Choose the correct answer:

1-For PN junction diode, Barrier potential equals to

a- $V_B=(KT/q)[\ln N_A.N_D/ni^2]$.

b- $V_B=(KT/q)[\ln N_A.N_D/ni^2]$.

c- $V_B=(0.5)[\ln N_A.N_D/ni^2]$.

2-For the design of power supply, its transformer used to

a- Amplify the output power.

b- Regulate the output power.

c- Decrease the AC input voltage .

3- BJT can be used as inverter in

a- Common emitter Configuration

b- Common base Configuration

c- Common collector Configuration.

4- The major difference between Bipolar and unipolar device is

a- The current in unipolar device is a contribution from electrons and holes .

b- The current in Bipolar device is a contribution from electrons and holes .

c- Bipolar device have two polarities and the unipolar have one polarity.

5- The source of leakage current in BJT is

a- I_B

b- I_{CO}

c- I_E

6- β is

a- A common base amplification factor

b- A common emitter amplification factor

c- A common collector amplification factor.

7- In Common base output characteristics

a- Emitter current is not equals to collector current

b- $I_C=\alpha I_E$

c- $I_C=\beta I_B$

8- To decrease the input resistance of BJT ,

a- Emitter – base junction connected in Reverse bias

b- collector – base junction connected in short circuit

c- Emitter – base junction connected in Forward bias

9- FET has

a- A higher voltage gain than BJT

b- A larger size than BJT

c- A lower voltage gain than BJT

10- For p- channel JFET operation

a- V_{DS} must be reverse bias

b- V_{DS} must be forward bias

c- V_{DS} must be zero volt.

11- For JFET

a- V_{GS} is a control voltage

b- V_{DS} is a control voltage

c- V_{GS} must be zero volt

12- In Enhancement MOSFET

a- I_D is a function of Vp

b- I_D is a function in VT

c-There is no Sio_2

تابع نموذج رقم2

Question Two: (4 MARKS)

Choose the correct answer:

1- For the circuit shown in Fig.1, Vo equals to

(a) = 0.35 v (b) =0.7 v (c) =1.4 v

2- For the circuit shown in Fig.1, I_1 equals to

(a) = 19.3 mA (b) = 19.65 mA (c) =18.6mA

3- For the circuit shown in Fig.1, I_{D1} equals to

(a) = 9.825mA (b) = 9.65mA (c) = 9.3 mA

4- For the circuit shown in Fig.1, I_{D2} equals to

(a) = 9.825 mA (b) = 9.65mA (c) = 9.3 mA

Question Three: (8 MARKS)

Choose the correct answer:

1- For the circuit shown in Fig.2,if R_L = 470 KΩ , R_{Lmin} equals to

(a) = 470Ω (b) = 200Ω (c) =690Ω

2- For the circuit shown in Fig.2,if R_L = 470 KΩ , R_{Lmax} equals to

(a) = 400Ω (b) = 900Ω (c) =1kΩ

Question Four: (8 MARKS)

Choose the correct answer:

1-For the circuit shown in Fig.3, If I_C=4 mA, $I_{Csat.}$=8mA, R_E equals to

(a) = 0.5kΩ (b) = 1kΩ (c) =1.5kΩ

2-For the circuit shown in Fig.3, If I_C=4 mA, $I_{Csat.}$=8mA, R_C equals to

(a) ≈ 4.5kΩ (b) ≈ 2kΩ (c) ≈ 4k Ω

3-For the circuit shown in Fig.3, If I_C=4 mA, $I_{Csat.}$=8mA, R_2 equals to

(a) ≈ 4kΩ (b) ≈ 16kΩ (c) ≈8kΩ

4-For the circuit shown in Fig.3, If I_C=4 mA, $I_{Csat.}$=8mA, R_1 equals to

(a) ≈ 36.6kΩ (b) ≈ 25.7kΩ (c) ≈102.51kΩ

Question Five: (9 MARKS)

Choose the correct answer:

1-For the circuit shown in Fig.4, I_C equals to

(a) ≈ 5.71mA (b) ≈ 6.92mA (c) ≈ 0.74mA

2-For the circuit shown in Fig.4, V_{CE} equals to

(a) ≈ -0.75v (b) ≈ 7.87v (c) ≈ 9.177v

Question Six: (9 MARKS)

Choose the correct answer:

1-For the circuit shown in Fig.5, if I_{DSS}=10mA, V_P=-6v, V_{DS} equals to

(a) ≈ 2.58v (b) ≈ 6.3v (c) ≈ 3.9v

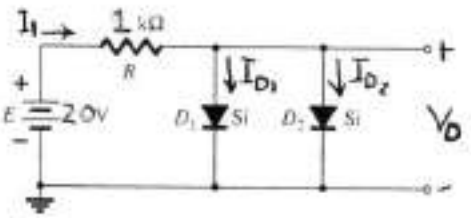


Fig.1

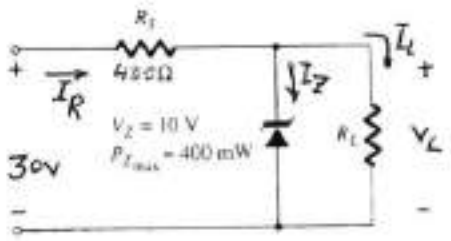


Fig.2

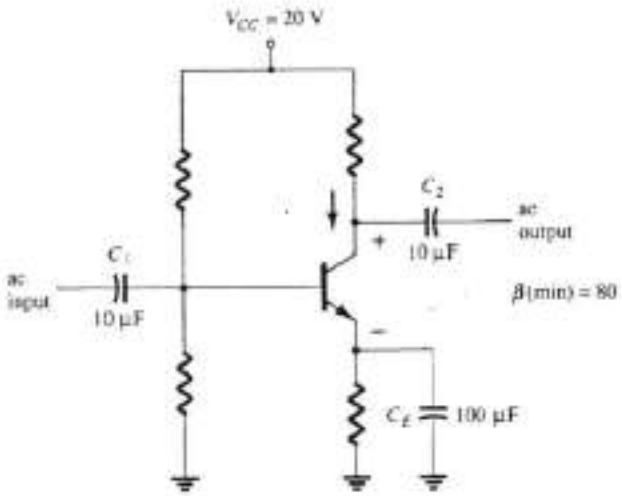


Fig.3

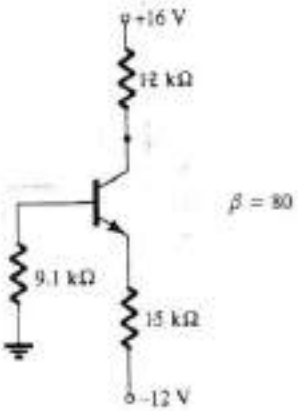


Fig.4

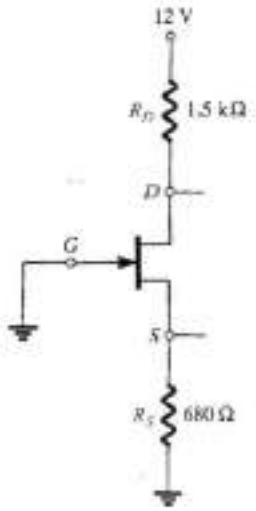


Fig.5

بالتوفيق والنجاح

أ.د. أحمد شعبان سمرة

Biomedical Instrumentation
Course Code: ECE 396
Fall semester Exam.

BME Program - Level 300
Exam Date: 25-1- 2022
Allowed Time: 2 hours

Attempt the following questions. Assume any missed data. Full mark is 50

Q.1) To design a medical care system for the Egyptian army, you are asked to acquire and control the electrocardiogram (ECG) signal from the soldier using the block diagram shown in Fig. 1. The system is put in the soldiers' room, monitor their heart on daily basis, and send an alarm to a doctor if heart rate is abnormal. Answer the questions below:

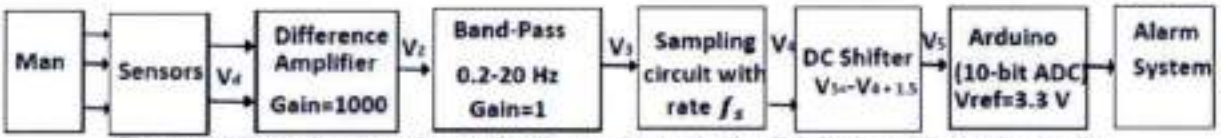
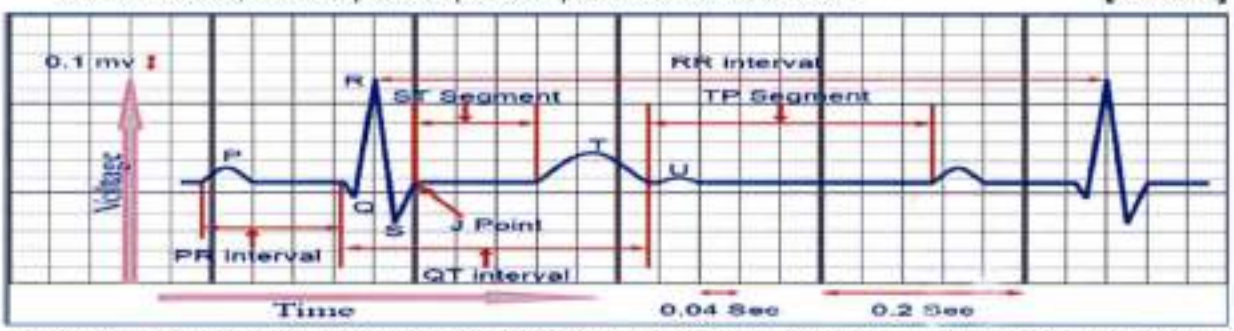


Fig. 1 A block diagram for a circuit used to acquire ECG signal from the body

a) **For the sensors used, answer the following:** **[4 Marks]**
i. The type of the sensor used is .....
ii. Where are the sensor connected to the human body?
iii. Sketch the sensor structure

b) **For the standard ECG waveform shown below,** find the RR interval, the heart rate (in bpm), the PR interval, and the peak-to-peak amplitude of the QRS wave. **[4 Marks]**



c) Design the difference amplifier of gain=1000 using an instrumentation amplifier with discrete elements. **[4 Marks]**

d) Find the minimum sampling f_s rate of the sampling circuit **[2 Marks]**

e) Sensor output V_d is between -1.5 mV to 1.5mV. Design a DC shifter $V_o = V_5 = -V_4 + 1.5$, to enter only positive voltages to Arduino. Hint: Use a summing amplifier. **[4 Marks]**

f) You need to design an ADC. Design a successive approximation ADC if V_5 is between 0 to 3V (use **Vref=3.3V**) and the maximum allowable quantization error (step size) is 0.5 V. *Determine the output code for three sequence samples of 1.5V, 1.9V, and 3.1V.* **[6 Marks]**

g) An Arduino with 10 bit internal ADC with Vref=3.3V is used to record ECG, measure heart rate, and activate an alarm system if the heart rate is abnormal (below 60 bpm or above 100 bpm). Write a code to measure heart rate (bpm) **[3 Marks]**

Hints:

Let Sensor output Vd is between -1.5 mV to 1.5mV.
Let a practical sampling rate is selected as f_s=100 sample/sec.
Arduino take a reading every 10 ms
Whenever $v\ d$ just exceed 1 mV (two samples with a separation 10 ms: one is below 1mV and the next is above 1mV), a peak is found
Heart rate cycle duration is measured as the duration between two peaks
Use the instruction ***float*** **time1 =*millis*()** to return the number of milliseconds since the Arduino board began running the current program
Note that V_S is connected to Arduino PIN 3 (an analog PIN).

Q.2.a) Using neat sketches **only**, compare between the 4-bit Binary Weighted Resistor and R-2R Ladder. Assume reasonable values for resistors and V_{ref} **[5 Marks]**

Q.2.b) Complete the following table for the ADC types **[4 Marks]**

Type	Speed	Cost	Resolution
Dual slope	.....	.....	.....
Flash type	.....	.....	.....
Successive Approximation	.....	.....	.....
Sigma - Delta	.....	.....	.....

Q.2.c) A temperature sensor produced the readings in mV as shown the following table

Temp	0	10	20	30	40	50	60	70	80	90	100
Reading	12.3	18.2	25.4	37	43.6	55.8	62	67.8	70.4	72.1	73

i. Plot the input-output calibration for this sensor. يفضل الرسم فى صفحة الرسم البيانى
ii. Find the offset and sensitivity for readings between 0° C to 70° C **[5 Marks]**

Q.3.a) Correct the errors, if any, in each of the following statements **[6 Marks]**

إذا كانت الجملة صحيحة يكتب رقم الجملة وعلامة (√) فقط أمامها، أما إذا كانت الجملة خطأ فتوضع علامة (x) أمام رقم الجملة، وتعاد كتابة الجملة كاملة بعد تصحيحها.

i. Accuracy refers to the degree of measurement reproducibility.
ii. The physical dimension of a MEMS can range from several millimeters to less than 1nanometer.
iii. EMG signals can be used to diagnose disorders of the bowel.
iv. Delta waves (1-3.5 Hz) are emitted from the temporal and occipital lobes.
v. When excitatory postsynaptic potential reaches a specific value, it generates an action potential.
vi. Nanotechnology is the technology and science of light generation, handling and control.

Q.3.b) Complete each of the following statements يكتب رقم الجملة والكلمة/الكلمات الناقصة فقط **[6 Marks]**

i. ..... is defined as the ratio of output change for a given change in input.
ii. ..... is considered to be the standard electrode against which the half-cell potentials of other metal electrodes are measured.
iii. ..... is a medical device that indirectly monitors the oxygen saturation of a patient's blood.
iv. Bioelectrical signals from skeletal muscle are known as .....
v. Bioelectrical signals from the brain have ..... characteristics.
vi. ..... is a fluorescent chemical compound that can re-emit light upon light excitation.

☺ **With best wishes** ☺ **Prof. Hossam El-Din Moustafa**

FACULTY OF ENGINEERING
MANSOURA UNIVERSITY

English Language (2)

Final Exam (Wednesday -26 January 2022) Total Mark: 50

Choose the correct answer from a, b, or c:

1– Money and property which you receive from somebody who has died is a/an .....

a- estate b- will c- inheritance

2 – A/An .....is a small device that helps you to breathe more easily if you have asthma or a bad cold.

a- syringe b- inhaler c- syrup

3 - .....are antonyms.

a- Burnt / scalded b- Ignorance / knowledge c- Kit / equipment

4 – A.....is a pupil who stays away from school without permission.

a- riotous b- autistic c- truant

5 – The noun form of the verb (to assume) is .....

a- an assuming b- an assumption c- assurance

6 – A.....school is a school suitable for the majority of children.

a- senior b- grammar c- mainstream

7- Autism is.....

a- a type of mental condition, present from early childhood
b- a type of cold or flu c. a mental illness characterized by a refusal to eat

8 – If a pupil is....., he is asked to leave for a certain period of time because he has behaved badly, but he can then come back.

a- expelled b- suspended c- tired

9 – A widower is.....

a- a woman whose husband has died and who has not married again
b- a man whose wife has died and who has not married again c. somebody's wife, husband or partner

10 – The word (devastating) means.....

a. difficult to believe b- not pleasant c- causing shock or distress

11. They ..... a lot of work for charity.

a. have done b. doing c. are done

12. How many murders do they ..... before they are 18?

a. saw b. seeing c. see

13. What is the most ..... way to spend the weekend?
a. relaxing b. relax c. relaxed

14. Do you think more people will use green energy?.....
a. Yes, we will b. Yes, they can c. No, I don't

15. I wish I could ..... before I'm 50.
a. retired b. retire c. retiring

16. I'm looking forward ..... more time in the garden.
a. to spending b. spent c. spending

17. Do you want ..... abroad in the future?
a. leaving b. to live c. will live

18. I met my friends on holiday .....
a. very often b. last summer c. every summer

19. Tolstoy and his family ..... with her when she felt sick.
a. got stayed b. were staying c. stays

20. In our last vacation, we ..... take lots of games. We had free online games.
a. had to b. hadn't to c. didn't have to

21. My dad ..... a cup of coffee.
a. wants b. is wanting c. want

22- I've decided what I want to do in the future; I'm going to ..... for the army.
a. sign off b. sign up c. sign in

23- You are happy. .....you?
a. Aren't b. will c. can

24- The branch of mathematics that is concerned with the properties of space associated with distance is .....
a. anatomy b. geometry c. botany

25- The science which deals with the physical structure and substance of the earth is .....
a. physics b. ecology c. geology

26- A person who has withdrawn from a position or occupation is.....
a. mature b. retired c. disabled

27- I .....him since he ..... a child.
a. haven't seen/was b. didn't see/is c. hadn't seen/is

28- A long line of rocks or sand, the top of which is just above or just below the surface of the sea is .....
a. the sea bed b. the reef c. the lagoon

29- The scientific study of animals is .....
a. zoolgy b. astronomy c. biology

30- Don't say anything; just ..... if you agree.
a. nod b. nudge c. shake

31- A person who is between seventy and seventy nine years old is.....
a. elderly b. teenage c. senior

32-A document in which grades and qualifications are listed is a/an .....
a. certificate b. will c. agreement

33-The main buildings of a university or college is .....
a. a hall of residence b. a campus c. a lectern

34- The milk was ..... slowly through the paper carton.
a. trickling b. seeping c. pouring

35- I knew he was joking; he ..... at me before he told us the news.
a. winked b. waved c. frown

36- My dinner is ready so I need to ..... now.
a. leave b. live c. lead

37- ..... is the science of sound.
a. statistics b. acoustics c. ballistics

38– The verb *supersede* means to take the place of
a. True b- False

39 – The noun *constraints* means to eliminate all restrictions
a. True b- False

40 - The adjective *cost effective* means profitable
a. True b- False

41 – The verb *evaluate* means to underestimate things
a. True b- False

42 – The verb *quantify* means to predict
a. True b- False

43 – The noun *capacity* means limit of volume held
a. True b- False

44- The noun *provision* means plan
a. True b- False

45 – The adjective *viable* means reasonable
a. True b- False

46 – The noun *specifications* means particulars
a. True b- False

47 – Wingspan is the total distance spanned by both wings
a. True b- False

48- Maximum cabin width is the external width
a. True b- False

49 – Maximum cabin width is the internal width
a. True b- False

50 – Overall length is measured between the front and the rear extremities
a. True b- False

Best wishes

Assoc. Prof. Rehab Farouk Gad

	Mansoura University Fac. of Engineering BME Program Level 400		Public Health and Toxicology BME 491 Time allowed :2 hours Full Mark:50 Marks	
Final Exam (26-1-2022) – Final Exam first Semester				

Question I: Select the single BEST answer: (1 Marks Each)

1. Which of the following is False about the most pressing patient safety considerations?

a. Healthcare-associated infections.
b. Surgical complications.
c. Correct diagnosis
d. Medication errors

2 .The best definition of quality standards is :

a. Statement of quality expected.
b. Variables which measure change in quality.
c. Doing right things right for the first time & every time.
d. Customer satisfaction

3. Which of the following is defined as epidemic?

a. Scattered cases of a disease
b. Constant presence of a disease in a certain area.
c. Sudden appearance of a disease in certain area .
d. Diseases naturally transmitted between animals and man.

4. Pareto principle states that:

a. 20% of the problem comes from 80% of the causes.
b. 80% of the problem comes from 20% of the causes.
c. 50% of the problem comes from 50% of causes
d. the trivial many and vital few describes the outcome.

5. The introduction of serum containing already formed immunoglobulin as a specific prevention in called:

a. Vaccines
b. Seroprophylaxis
c. Chemoprophylaxis
d. Chemotherapy

6. Components of critical systems for hospital safety not include:

a. Electrical systems
b. Hospital preparedness
c. Transportation emergency ambulance system.
d. Water supply system

7. Diseases naturally transmitted between animals and man is called :

a. Latent infection
b. Exotic disease
c. Subclinical (in apparent) infection.
d. Zoonotic diseases.

8. The vaccine vial monitor (when Inner Square matches the color of the outer circle) is interpreted as:

a. Use the vaccine immediately
b. Expiry date has not been passed
c. Don't use the vaccine (discard it).
d. Don't discard the vaccine

9. Which of the following factors <u>does not</u> damage polio vaccines?

a. After expiry date
b. Freezing
c. Heat &sunlight
d. Disinfection and antiseptics.

10.In vaccines refrigerator; TT, DT and DPT vaccines should be kept in the:

a. Top shelf
b. Middle shelf
c. Lower shelf
d. Door shelves.

11. Which of the following dimensions is not included in the WHO definition of health:

a. Physical well-being
b. Occupational well-being
c. Mental well-being
d. Social well-being

12. In live attenuated vaccines which of the following is true:

a. Duration of immunity is less
b. Cell mediated immunity is poor
c. There is always need for adjuvant
d. Reversion to virulence is possible.

13. Biological environment that affect health determinants include all the following except:

a. Insects
b. Animals
c. Microbes
d. Vaccination

14. Non-Communicable diseases is defined as :

a. Organisms or substances such as bacteria, viruses, or parasites that are capable of producing diseases
b. Disease result from infection and transmitted directly or indirectly.
c. Entry, development multiplication of infectious agent in body of man or animal.
d. Impairment in body function or structure that necessitates modification in person's lifestyle.

15.All the following are patterns of disease except:

a. Sporadic
b. Endemic
c. Periodic
d. Exotic

16.All the following are characters of chain of infection except:

a. A chain of factors necessary for development & maintenance of any infectious disease in the community.
b. Discontinuity of the chain at any link will stop of infection
c. Mode of transmission of infection is part of chain of infection
d. Using refrigerators is part of the chain of infection.

17. A localized epidemic of food poisoning that affects large number of students in a school:

a. Sporadic
b. Endemic
c. Outbreak
d. Epidemic

18. Quality improvement tools include all the following except:

a. Brainstorming Tool.
b. Fishbone Diagram.
c. Standards
d. Prioritization Matrix.

19. The degree to which something is successful in producing a desired result (under real circumstances) is :

a. Efficiency
b. Effectiveness
c. Equity
d. Efficacy

20. All of the following are elements of accessibility as dimension of Quality Except :

a. Physical
b. Cultural
c. Functional
d. Equity

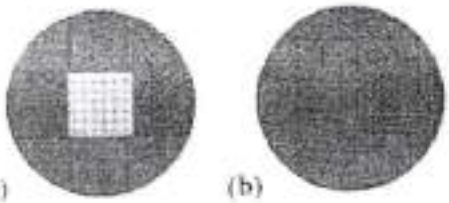
21. Beyond the discard point in a vaccine vial monitor means :

a. Allowed to use vaccine
b. Inner square matches color of out circle
c. Inner square darker than outer circle
d. The expiry date has not been passed

22. **Which of the following waste types belong to that symbol?**

a. Biological waste
b. Radioactive waste
c. Chemical waste
d. Regular waste

23. **As regard the vaccine vial monitoring (b) denote that the vaccine :**



a. Could be used normally
b. Could be used within 6 hours
c. Can be used within 3 days
d. Couldn't be used

24. **BCG vaccine is stored in :**

a. in the first shelf of vaccine refrigerator
b. in the middle shelf
c. in the lower shelf
d. in freezer compartment

25. **If windows A, B, C and D are all white this means:**

a. use vaccine normally
b. vaccine has been exposed to temperature > 10°C but < 34°
c. vaccine has been exposed to temperature > 34°
d. The expiry date for vaccines is reached

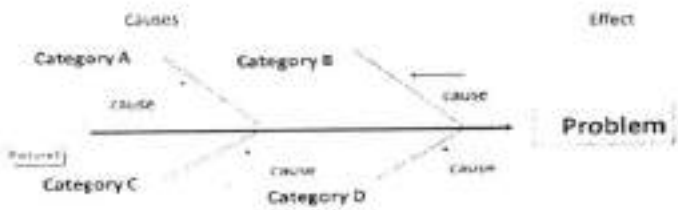
26. **All of the following is considered characteristics of primary prevention except :**

a. During pre-disease stage
b. Health promotion
c. Specific prevention
d. Screening

27. **COVID—19 spread around the world is considered?**

a. Epidemic
b. Endemic
c. Sporadic
d. Pandemic

28. **The following figure is named :**



a. Pareto chart
b. Fish bone diagram
c. prioritization matrix
d. Talley sheet

Question II :Check whether the following statements are true or false: (1 Marks Each)

1. Food poisoning infection is transmitted through blood borne mode of transmission
2. Influenza infection is transmitted through respiratory tract
3. Exotic disease is a diseases imported into a country e.g. imported malaria..
4. Killed vaccine give lgG antibody only .
5. Health education is part of specific prevention against infections.
6. A cold box is an insulated container lined with ice-packs to keep vaccines & diluents cold during transportation and /or short period storage (from 2-7days)
7. In vaccine refrigerator we should put polio & measles vaccines in the middle shelf vaccines can be kept on the door shelves
8. Vaccine vials kept in boxes labelled "use first" contain vaccines with VVMs showing more heat exposure.
9. Functional accessibility means that the service is within reach of every customer .
10. Equity is one of the quality improvement tools.
11. Non-Communicable diseases is a disease result from infection and transmitted directly or indirectly from: Man to man, Animal to animal, Animal to man Or from environment.
12. Rehabilitation of individuals with disability is part of tertiary prevention of disease.
13. Early detection of disease is part of primary prevention.
14. measles vaccines is a live attenuated vaccine.
15. Reconstituted vaccines can be used within 6 hours in the refrigerator.
16. One of the criteria of the ideal vaccine that it does not need specific handling.
17. Immunity is the weapons to prevent diseases, made of microorganisms (similar to ones cause diseases) or of toxins.
18. DPT vaccine is kept in middle shelf of the refrigerator.
19. Vaccines are used against virus and /or toxins of bacteria.
20. Cold chain system is a series of transportation links during which adequate refrigeration is required to maintain the vaccine potency.
21. Dead vaccine should be given in multiple doses to give desired protection
22. Human tissue and body organs should be packed in yellow bags

GOOD LUCK

Dr/ Hend Magdy Mohamed Gomaa

جامعة المنصورة
كلية الهندسة
برنامج هندسة الاتصالات والحاسبات
Sophomore - 2020
تاريخ الهندسة التكنولوجيا
نهاية الفصل
استاذ المادة : محمد حسين محمد عيسى الشافعى

الفصل الدراسى الأول
تاريخ : 2022 يناير
الوقت : 60 دقيقة
عنوان الاختبار : تاريخ الهندسة والتكنولوجيا
الدرجة : 50
نموذج رقم : 1
كود المقرر : UNR 171

السؤال رقم 1 : اختر من متعدد [50 درجة]

[1] الهندسة عند اليونانيين تعني علم .....

(أ) قياس الطول (ب) علم القياس (ج) قياس الأشكال (د) قياس الأرض

[2] تؤكد التحريات الاثرية الى أن ..... هو مهد العلوم والتكنولوجيا في اسيا وافريقيا منذ نحو ثمانية الاف سنة

(أ) وادى النيل (ب) وادى الملوك (ج) وادي الرافدين (د) وادى نجران

[3] يعود الفضل في اختراع النظام الستيني اي تقسيم الدائرة الى (360) درجة والساعة الى (60) دقيقة إلى .....

(أ) العراقيون (ب) المصريون (ج) الفرس (د) اليونانيون

[4] كانت أول من استعمل المساطر (جمع مسطرة) لقياس الأطوال والمساحات والأحجام في الفترة .....

(أ) 4000-2000 قبل الميلاد (ب) 1500-1000 قبل الميلاد (ج) 400-200 قبل الميلاد (د) 150-200 قبل الميلاد

[5] أول من كانوا يملكون تقريبا جيدا للعدد (Pi) π هم .....

(أ) العراقيون (ب) المصريون (ج) الفرس (د) اليونانيون

[6] كان شعار المدرسة الفيثاغورثية حوالي 560 – 480 قبل الميلاد هو .....

(أ) تنمية التفكير المنطقي (ب) تنمية الفهم العملي (ج) كل شيء هو عدد (د) تنمية الخيال

[7] في عهد الحضارة العربية والإسلامية تطور علم حساب المثلثات تبعا لاحتياجات .....

(أ) علم الفلك (ب) علم الميكانيكا (ج) علم الكيمياء (د) علم السكون

[8] ظهرت الروابط بين الجبر والهندسة بفضل رياضيين اهتموا بدراسة التحليل والجبر مثل العالم .....

(أ) Pascal (ب) Caylay (ج) Chasles (د) Euler

[9] الفرق بين التقني (الفني) والمهندس هو .....

(أ) يقوم التقنى بتطبيق المبادئء والاسس الهندسية فى الانتاج الصناعى اما المهندس يستند لخبراتة

(ب) يقوم المهندس بتطبيق المبادئء والاسس الهندسية فى الانتاج الصناعى اما التقنى يستند لخبراتة

(ج) يقوم التقنى بتطبيق المبادئء والاسس الهندسية فى الانتاج الصناعى استنادا الى خبراتة اما المهندس يقوم بتشخيص المشكلات وحلها بتطبيق المبادئء والاسس العلمية.

(د) يقوم المهندسى بتطبيق المبادئء والاسس الهندسية فى الانتاج الصناعى استنادا الى خبراتة اما التقنى يقوم بتشخيص المشكلات وحلها بتطبيق المبادئء والاسس العلمية.

[10] اهم الانجازات اللتى حدثت للهندسة الميكانيكية اوائل القرن السابع عشر كانت فى ..... عندما قام إسحاق نيوتن بوضع قوانينه الثلاثة للحركة.

(أ) هولندا (ب) اسكتلندا واليابان (ج) انجلترا واليابان (د) انجلترا

[11] تم الاعتراف بمؤسسة المهندسين الميكانيكيين في برمنغهام كأول جمعية مهنية للمهندسين الميكانيكيين في عام .....

(أ) 1800 م (ب) 1840 م (ج) 1847م (د) 1900 م

[12] اول منظمة امريكية للمهندسين الميكانيكيين تشكلت عام .....

(أ) 1800 م (ب) 1880 م (ج) 1847م (د) 1900 م

[13] اول جامعة امريكية لتدريس الهندسة الميكانيكية كانت فى عام .....

(أ) 1825 م (ب) 1880 م (ج) 1847م (د) 1900 م

[14] الهندسة الميكانيكية هى فرع من فروع الهندسة يهتم .....

(أ) بدراسة وتطبيقات علوم الكهرباء والإلكترونيات والمجالات الكهرومغناطيسية

(ب) بالتصميم والتصنيع والتشغيل للالات والاجهزة المختلفة

(ج) بنقل المعلومات عن طريق النبضات الكهربية أو الموجات الكهرومغناطيسية

(د) بدراسة وتصميم وتحليل المنشآت المدنية المختلفة

[15] يرجع تاريخ أقدم توربين معروف إلى نحو ..... عام، وهي عجلات مائية بسيطة استخدمها الإغريق القدامى.

(أ) 3,000 (ب) 500 (ج) 2,000 (د) 1,000

[16] من العلوم الاساسية لمهندس ميكانيكا .....

(أ) علم الحركة والسكون وميكانيكا المواد وانتقال الحرارة والميكاترونيات

(ب) علم التشييد والبناء

(ج) علم القوى الكهربية

(د) علم الكيمياء الكهربية

[17] ساعدت ..... على حدوث تقدم كبير في شتى تخصصات الهندسة

(أ) الأزمات الاقتصادية (ب) الظواهر الطبيعية (ج) التغيرات المناخية (د) الحروب العالمية

[18] أول من أطلق على التربينة هذا الاسم هم العالم

(أ) فرانسيس كابلن (ب) كلود بيردن (ج) بيركنز (د) نيوتن

[19] يستخدم ..... في تحويل طاقه الوضع للميا خلف السدود الى طاقه كهربية

(أ) التربينات (ب) الة الاحتراق الداخلى (ج) الخلايا الشمسية (د) الغلايات

[20] تعتبر ..... من الأدوات الحديثة لمهندس الميكانيكا

(أ) برامج الحاسب المستخدمة في النمزجة والمحاكاة (ب) أدوات القياس المختلفة (ج) عدد القطع والماكينات (د) الت الاحتراق الداخلي

[21] في .....يتم الاستفادة من ارتفاع درجة الحرارة في جوف الأرض باستخراج هذه الطاقة وتحويلها إلى أشكال أخرى.

(أ) طاقة الحرارة الأرضية (ب) الطاقة الشمسية (ج) طاقة الرياح (د) الطاقة الكهرومائية

[22] تعتبر ..... من أنواع الطاقه المتجدده والنظيفة

(أ) الطاقة الكهرومائية من السدود (ب) طاقة الوقود الحفري (ج) الطاقة الحركية (د) طاقة الوضع

[23] يتم تحويل الطاقة الحركية للرياح إلى كهرباء باستخدام .....

(أ) تربينات (ب) غلايات (ج) خلايا شمسية (د) كايلات كهربية

[24] في مؤتمر ..... اتّفق معظم رؤساء الدّول على تخفيض إنتاج ثنائي أكسيد الكربون في الأعوام القادمة

(أ) كيوتو باليابان (ب) بروكسيل (ج) برلين (د) القاهره

[25] معظم محطات الطاقة الكهربية في مصر تدار عن طريق ..... .

(أ) التربينات البخارية (ب) الطاقة الشمسية (ج) الطاقة النووية (د) طاقة الرياح

[26] يفضل استخدام ..... في غلايات الضغط العالي

(أ) مياه الصنابير (ب) مياه الآبار (ج) مياه الأنهار (د) مياه خاليه من الأملاح

[27] يعتمد تخصص الميكاترونكس على دمج .....

(أ) أنظمه كهربيه وإلكترونية (ب) أنظمه ميكانيكية وإلكترونية (ج) أنظمه ميكانيكية واتصالات (د) أنظمة كهربية وحرارية

[28] صيغ مصطلح الميكاترونكس من قبل مهندس ياباني في شركة ياساكوا الكهربائية عام .....م

(أ) 1969 (ب) 1979 (ج) 1989 (د) 1959

[29] تعتبر ..... من أنظمة الميكاترونكس

(أ) الطيار الألى (ب) ماكينات التشغيل العادية (ج) أجهزه الحاسب الالى (د) نظام التوجيه فى السياره

[30] تهتم الهندسة الكهربيه بالأمور المتعلقة بنظم الكهرباء .....

(أ) منخفضة الجهد (ب) عالية الجهد (ج) متوسطة الجهد (د) منعدمة الجهد

[31] تهتم الهندسة الإلكترونية بالأمور المتعلقة بنظم الكهرباء .....

(أ) منخفضة الجهد (ب) عالية الجهد (ج) متوسطة الجهد (د) منعدمة الجهد

[32] الهندسة الكهربيه هو تخصص يهتم بدراسة وتطبيقات .....

(أ) الكهرباء والمجالات الكهرومغناطيسية (ب) الكهرباء والاتصالات (ج) الميكانيكا والتحكم (د) الكهرباء والحركه

[33] بمساعدة هندسة الإتصالات يتم نقل ..... عن طريق النبضات الكهربيه او الموجات الكهرومغناطيسية

(أ) الحراره (ب) المعلومات (ج) الطاقة (د) الأجسام

[34] يعتبر ..... من المواد الأكثر شيوعا وتعتبر أساس فى صناعه الإتصالات

(أ) الحديد (ب) الكربون (ج) الألومنيوم (د) النحاس

[35] حدثت طفره فى مجال الإتصالات بسبب استخدام ..... فى نقل المعلومات

(أ) كابلات الألياف البصرية (ب) كابلات البلاستيك (ج) الإشارات المغناطيسية (د) الإشارات الحرارية

[36] تعتبر تصميم ..... هى الأساس المبنى عليه أجهزه الإرسال و الإستقبال

(أ) دوائر الرنين (ب) دوائر الحركة (ج) الشكل الجمالى (د) البطارية

[37] يعتبر ..... من الأجزاء الأساسيه فى الدوائر الكهربيه والإلكترونية

(أ) المكثف (ب) الزنبرك (ج) الكتلة (د) الكابلات

[38] تعتبر الهندسة المدنية من أقدم التخصصات الهندسية حيث يرجع اهتمام الإنسان بالبناء الى .....

(أ) بداية الخليقة (ب) العصور الوسطى (ج) عصر النهضة (د) العصر الحديث

[39] ينقسم تخصص الهندسة المدنية بصوره عامه الى الهندسة الإنشائية و .....

(أ) الأشغال العامة هندسة (ب) الهندسة البحرية (ج) الهندسة المعمارية (د) الهندسة الوصفية

[40] يعتبر تصميم و بناء وتشييد الأبنية وناطحات السحاب من مهام .....

(أ) الهندسة المعمارية (ب) الهندسة الإنشائية (ج) هندسة الأشغال العامة (د) الهندسة الجيولوجية

[41] تعتبر إنشاء شبكات إمداد مياه الشرب وشبكات الصرف الصحي من مهام .....

(أ) الهندسة المعمارية (ب) الهندسة الإنشائية (ج) هندسة الأشغال العامة (د) الهندسة الجيولوجية

[42] يعتبر ..... من أحدث المواد الإنشائية (مواد البناء) المستخدمة حديثا

(أ) أقطاب البلاستيك المسلح بالألياف الزجاجية (ب) الحديد المسلح (ج) الرمل الأسود (د) الحجر الجيرى

[43] من أهم خصائص المهندس المدنى الناجح هو .....

(أ) يتميز بروح القيادة والإدارة والتنظيم (ب) بالشجاعة والقوة يتميز (ج) يتميز بالصبر وقوة التحمل (د) يتميز بالسرعة والكفاءة

[44] هندسة ..... تختص بدراسة خصائص الموائع وأثرها على المنشاءات

(أ) الموائع (ب) الطرق (ج) الطيران (د) العمارة

[45] الهندسة ..... تختص بتصميم وتشغيل أنظمة الصرف الصحي ومحطات المياه

(أ) الصحية (ب) الطرق (ج) الطيران (د) العمارة

[46] يعكس ..... طبيعة الثقافه العامه والتراث السائد في أي عصر

(أ) فن العمارة (ب) فن ارسم (ج) فن الإدارة (د) فن تصميم

[47] الهندسة المعمارية ذات علاقة وثيقة ب .....

(أ) تخطيط المدن والتخطيط العمراني (ب) التصميم الميكانيكي (ج) المواد الهندسية (د) محطات الطاقة

[48] يعتبر كتاب ..... للمعماري فترو فيوس هو الكتاب الوحيد عن العمارة في العصور القديمة

(أ) كتب العمارة العشرة (ب) الفن المعمارى (ج) العمارة والتاريخ (د) الحياه المدنية

[49] في عصر النهضة انتقل فن العمارة الأوربية الى بلدان كثيره أهمها ..... عن طريق المهاجرين

(أ) كندا وامريكا (ب) البرازيل (ج) اليابان (د) الأندلس

[50] من رواد فن العمارة الحديثه العالم ..... اللذى حقق فكرة الإتصالى بين الحيز الداخلى والخارجي للمسكن

(أ) لوكوربوزية (ب) فان جوخ (ج) بيكاسو (د) مانيوال تورتون

[51] من أهم اعمال المعمارى فرانك لويد رايت بيت الشلال اللذى استخدم فية .....

(أ) التضاد في الملمس بين جدرانة (ب) الطاقة المتجدده (ج) النحت والرسم (د) التكنولوجيا الذكية

[52] يمكن للهندسة المدنية ان تشارك في مجال .....

(أ) بناء السفن والغواصات (ب) تصميم الات الاحتراق الداخلي (ج) تصميم مولدات الطاقه (د) عمل الموتور الكهربى

[53] مخترع جهاز فرق الجهد البدائي باستخدام قدم الضفدع هو العالم .....

(أ) لويجي جلفاني (ب) أينتهوفن (ج) هانز برجر (د) هرمان فون هلمهولتز

[54] مخترع مقياس ضغط الدم هو العالم .....

(أ) صامويل باتش (ب) هرمان فون هلمهولتز (ج) لويجي جلفاني (د) هانز برجر

[55] مكتشف الاشعة السينية هو .....

(أ) رونغتن (ب) هرمان فون هلمهولتز (ج) هانز برجر (د) لويجي جلفاني

[56] من أشهر علماء المسلمين في هندسة البصريات العالم .....

(أ) ابو ريحان البيروني (ب) تقي الدين الدمشقي (ج) ابن الهيثم (د) ابن سينا

[57] في السابق كانت تتم عمليات البيع والشراء باستخدام.....وهذا يدل علي تفوقهم في هندسة الانتاج وسباكة المعادن.

(أ) المقايضة (ب) عملات معدنية (ج) الإتفاقات الورقية (د) الوعود الشفوية

[58] من مظاهر تفوقهم في هندسة الانتاج والعمارة معا قام الاغريق بصناعة .....

(أ) السفن (ب) المعابد (ج) الخيام (د) العجلات الحربية

[59] استخلص اقليدس العديد من المبادىء من العديد من العناصر وهي ما تسمي بالهندسة .....

(أ) الملكية (ب) الإقليدية (ج) الشعبية (د) الفرعونية

[60] العالم الذي أوجد العلاقة بين اضلاع المثلث القائم وبالتالي خدم الهندسة بشكل عام هو .....

(أ) فيثاغورس (ب) أفلاطون (ج) اريسطو (د) إسحاق نيوتن

[61] أدّى ظهور ..... في سنة 1948م إلى حدوث ثورة في صناعة الأجهزة الإلكترونية.

(أ) المكثف (ب) الترانزستور (ج) التوربينات (د) المحركات البخارية

[62] قام الفيزيائي ..... بوضع القوانين الأساسية للكهرباء، وألف العديد من الكتب وأثبت الكثير من النظريات حول إشعاع الطاقة المغناطيسية.

(أ) إسحاق نيوتن (ب) جيمس ماكسويل (ج) توماس أديسون (د) ألبرت أينشتين

[63] يعتبر ..... أول تطبيق عملي للهندسة الكهربائية في عام 1837م، والذى كان مفتاح الهندسة الإلكترونية والإتصالات.

(أ) التلغراف (ب) التلفاز (ج) الترانزستور (د) المقاومة

[64] تتعامل ..... مع تصميم أجهزة وأنظمة الكمبيوتر.

(أ) هندسة الحاسوب (ب) هندسة التحكم (ج) هندسة الإتصالات (د) الهندسة الكهربية

[65] العالم ..... هو العالم الذي حصل علي جائزة نوبل في الفيزياء عام 1906 لاكتشافه الالكترون ولعمله علي توصيل الكهرباء في الغازات.

(أ) جوزيف طومسون (ب) جيمس ماكسويل (ج) نيلزبور (د) رذرفورد

[66] تهدف التكنولوجيا الخضراء الى .....

(أ) تقليل التلوث والانبعاثات الكربونية.
(ب) زياده استهلاك الطاقه.
(ج) منع استهلاك الطاقة.
(د) إنتشار الون الأخضر.

[67] يطلق على التكنولوجيا الخضراء .....

(أ) التكنولوجيا النظيفه
(ب) التكنولوجيا الحديثه
(ج) التكنولوجيا المسيطره
(د) تكنولوجيا البناء الضوئى

[68] تعد ..... من امثله التكنولوجيا الخضراء.

(أ) اعاده تدوير النفايات (ب) الصناعات الإلكترونيه (ج) المفاعلات النووية (د) المحطات البخارية

[69] الدولة التي وضعت لنفسها هدف بأن تكون خالية من الوقود الأحفوري خلال التسعة و عشرون سنة القادمة هي .....

(أ) أيسلندا (ب) المانيا (ج) اليابان (د) الصين

[70] تعتبر ..... من اهم تطبيقات هندسة الميكاترونكس.

(أ) القيادة الالية للمركبات. (ب) التشفير. (ج) الشبكات الاسلكيه. (د) نظام الحماية الألكترونية.

[71] تعد ..... من اهم واشهر الروبوتات الموجوده للتى تحاكى الإنسان.

(أ) الروبوت صوفيا. (ب) الزراع الالى. (ج) الحاسب الألى. (د) العربات الكهربية.

[72] أول إشارات التواصل المستخدمة في بداية علم الاتصالات هي إشارات .....

(أ) الدخان. (ب) كهربائية. (ج) مغناطيسية. (د) ضوئية.

[73] العالم صاحب براءه اختراع جهاز الهاتف هو .....

(أ) جرهام بيل. (ب) صموئيل فون. (ج) لابلاس. (د) سومرينج.

[74] العالم ..... هو العالم الذي اكتشف الخصائص الكمية للتيارات الكهربية.

(أ) جورج سيمون أوم (ب) جوزيف طومسون (ج) ألبرت اينشتاين (د) مايكل فاراداي

[75] العالم ..... هو العالم الذي وضع اسس الهندسة الكهربائية الحديثة.

(أ) مايكل فاراداى (ب) جيمس ماكسويل (ج) ألبرت اينشتاين (د) جوزيف طومسون

End of Questions Dr\Mohamed Elshafei

Mansoura University
Faculty of Engineering
Math. & Eng. Phy. Dept.
Academic Year: 2021 / 2022
Fall Semester
Saturday 29 / 1 / 2022

Numerical Analysis
Course code: MTH201
Final Exam
BME Level 200
Total Mark: 50
Time allowed: 2 hours

Answer the following questions

1st Question [24 marks]

(a) **Use** the finite difference method to approximate the solution to the following Laplace PDE

$$u_{xx} + u_{yy} = 0, \qquad 0 \le x \le 3,\ 0 \le y \le 3$$

With boundary conditions

$$u(0,y) = u(3,y) = 20(3-y),$$

$$u(x,3) = 0,$$

$$u(x,0) = \begin{cases} 20(x+3) & 0 \le x \le 1.5 \\ 20(6-x) & 1.5 < x \le 3 \end{cases}$$

Take $h = k = 1$ [6 marks]

(b) **Determine** the smallest positive root of the equation $e^x - 4x^2 = 0$ using Newton-Raphson method, correct to **5** decimal places. [6 marks]

(c) **Use** Taylor's method of order four to approximate the solution at $y(0.1)$ to the IVP

$$y' = 1 - x + 4y, \quad y(0) = 1.$$

Then, **find** the absolute error if the exact solution is $y = \frac{-3}{16} + \frac{x}{4} + \frac{19}{16}e^{4x}$ [6 marks]

(d) **Solve** the following linear system of algebraic equations using Gauss Seidel method accurate to **2** decimal places [6 marks]

$$\begin{aligned} 2x + 5y + z &= 8 \\ x - 2y + 5z &= 7 \\ 5x + 3y - 2z &= 12 \end{aligned}$$

2nd Question [26 marks]

(a) **Use** Lagrange interpolating polynomial to find $f(2)$ and $f'(2)$ for the following data

[6 marks]

x	-1	0	1	3
$f(x)$	-2	0	0	18

(b) The length of the ellipse $x = a\cos t$, $y = b\sin t$, $0 \le t \le 2\pi$ is given by $L = 4a\int_0^{2\pi} \sqrt{1 - e^2(\cos t)^2}\, dt$ where e is the eccentricity of the ellipse. **Use** Composite Simpson's rule with $N = 6$ subdivisions to estimate the length of the ellipse when $a = 2$ and $e = \frac{1}{3}$. [6 marks]

(c) **Fit** the equation $y = ax^2 + \frac{b}{x}$ to the data in the next table. [6 marks]

x	1	2	3	4
y	-1.51	0.99	3.88	7.66

(d) Given the initial value problem $y' = -xy^2$, $y(1) = -2$.

(i) **Use** Euler's method to find $y(1.1)$.

(ii) **Use** Modified Euler's method to find $y(1.2)$.

(ii) **Use** Runge-Kutta method of order four to find $y(0.9)$.

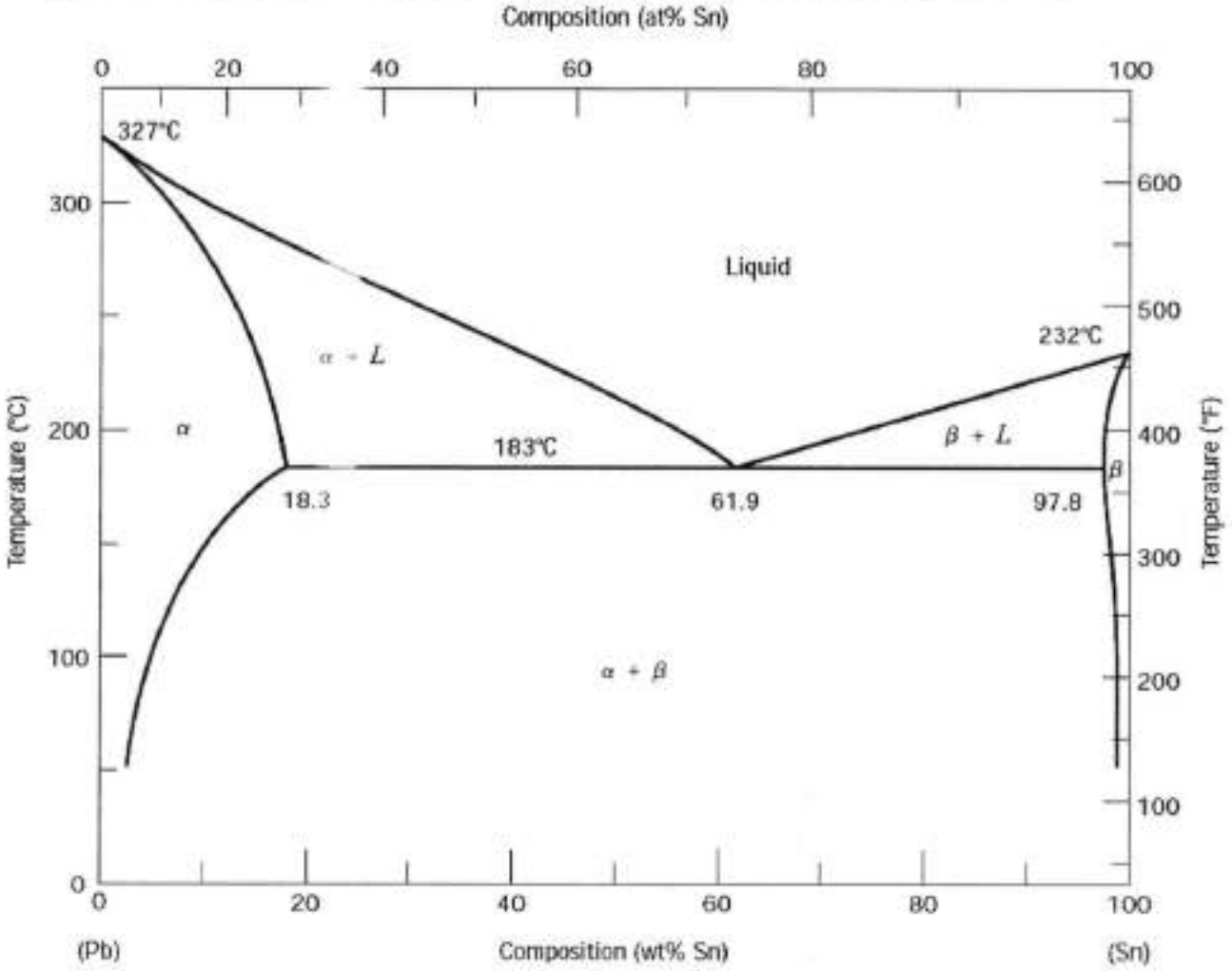
Find absolute error for all cases, if $y_{exact} = \frac{2}{x^2-2}$. [8 marks]

Best wishes Dr. Ayman Gomaa

c) Use the given lead - tin (-Pb) phase diagram shown in figure to answer the following for an alloy contain 60 wt% Pb - 40 w Sn: *(7 Marks)*

(i) The liquidus tempe ure, solidus temperature, freezing range and then draw the cooling curve

(ii) What are the phase esent and the phase compositions for this alloy at 200 °C?



***Question 4:* (8 Marks)**

(a) Briefly discuss the main applications of biomaterials? *(4 Marks)*

(b) There are two major types of artificial hip joint cemented and uncemented joints. Briefly discuss the advantages and disadvantages of the uncemented joints? *(4 Marks)*

With my best wishes

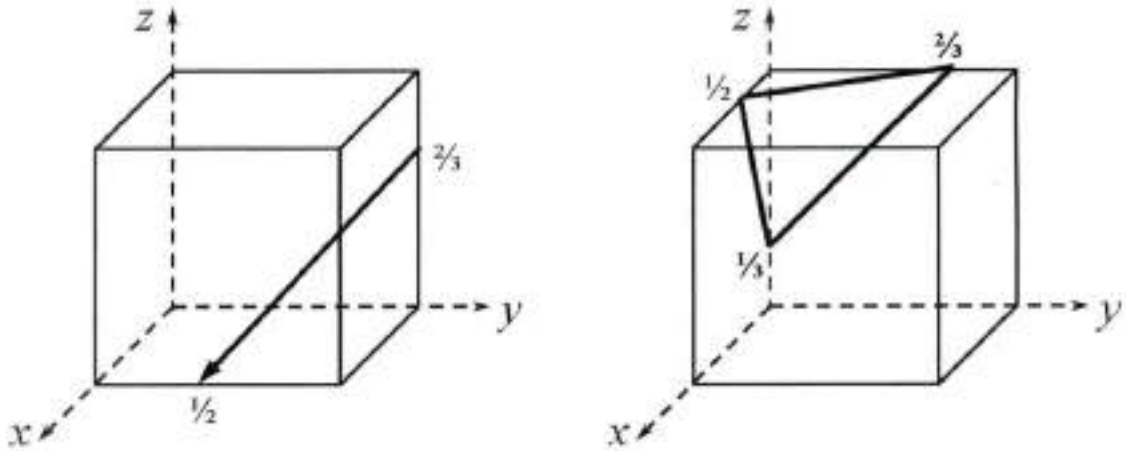
Associate Prof. Dr.\ Tawakol A. ENAB

Question 1: *(15 Marks)*

(a) What are the four components involved in the design, production, and utilization of materials, and briefly describe the interrelationships between these components? *(4 Marks)*

(b) Briefly discuss are the types of ceramic crystal structures? *(5 Marks)*

(c) Determine the indices for the direction and plane shown in the following cubic unit cells. *(6 Marks)*



Question 2: *(12 Marks)*

(a) A metal having a cubic structure has a density of 2.6 g/cm^3, an atomic weight of 87.62 g/mol, and a lattice parameter of 6.0849 Å. One atom is associated with each lattice point. Examine whether the metal has a BCC or FCC crystal structure. *(4 Marks)*

(b) Calculate the number of vacancies per cubic meter in iron at 850 °C. The energy for vacancy formation is 1.08 eV/atom. Furthermore, the density and atomic weight for Fe are 7.65 g/cm^3 and 55.85 g/mol, respectively. *(4 Marks)*

(c) A photomicrograph was taken of some metal at a magnification of 100X and it was determined that the average number of grains per square inch is 16. Compute the ASTM grain size number for this alloy. *(4 Marks)*

Question 3: *(15 Marks)*

a) Cite two reasons why interstitial diffusion is normally more rapid than vacancy diffusion. *(2 Marks)*

b) The diffusion coefficients for carbon in γ-iron are $5.9*10^{-12}$ m^2/s and $5.3*10^{-11}$ m^2/s given at 900 °C and 1100 °C respectively. Determine the values of D_0 and the activation energy Q_d? Determine the approximate time at 1000 °C that will produce the same diffusion result (in terms of concentration of C at some specific point in γ-iron) as a 30 hours heat treatment at 900 °C. (Note: the gas constant R = 8.31 J/mol. °K) *(6 Marks)*

Mansoura University | Biomedical Engineering Program | Faculty of Engineering

Course Title: Digital Control Systems	Date: Sunday, 30/1/2022, 12:30 PM
Course Code: CSE 494	Time allowed: 2 hours
Year: Level 300 +400 students	Total mark: 50 Marks
Semester: First term 2021 / 2022	Final term exam
No. of pages: [3]	Examiner: Dr. Eman M. El-Gendy

- **Assume Any Missing Data.**
- **Books and notes are not allowed.**
- **Attempt all the following questions.**

Choose only ONE correct answer

Part 1: 1 mark each (10 Marks)

1. **The process by which the discrete signal is reconstructed to continuous signal is .....**
   a) sampling. b) hold. c) stability. d) Mapping.
2. **In the sampling process, the continuous signal to be sampled is called .....**
   a) modulating. b) carrier. c) impulses. d) pulses.
3. **In normal sampling, the sampling instant is .....**
   a) equal to 1. b) equal to 0. c) greater than 0. d) greater than 1.
4. **When drawing the phase angle of ZOH, there is a change of ..... at every ω_s.**
   a) 90° b) 180° c) 270° d) 360°
5. **The final value of $c(k)$ for $C(z) = \frac{0.36\,z}{(z-1)(z-0.64)}$ is .....**
   a) 0 b) 0.36 c) ∞ d) 1
6. **The imaginary axis in s-plane is mapped to ..... in z-plane.**
   a) unit circle. b) inside unit circle. c) outside unit circle. d) imaginary axis.
7. **For a system having a characteristic equation $F(z)$, which of the following is a condition of stability using Jury's test?**
   a) $F(-1) > 0$ b) $F(-1) < 0$ c) $F(1) < 0$ d) $F(1) > 0$
8. **The sampling frequency depends on .....**
   a) sampling process. b) sampling instant. c) sampling period. d) All answers.
9. **Z-transform for $f(kT) = 3$ is .....**
   a) $\frac{3\,z}{z-1}$ b) $\frac{3\,z}{z+1}$ c) $\frac{z}{z+3}$ d) $\frac{z}{z-3}$
10. **If the sampling instant of a discrete signal equals 0.2 sec, sampling period must be .....**
    a) = 0.2 sec. b) > 0.2 sec. c) < 0.2 sec. d) No relationship.

Part 2: 2 marks each (40 Marks)

1. $f(5)$ for $F(z) = \frac{6}{(z+2)(z-3)(z+5)}$ is .....

   a) 0 b) -24 c) 162 d) -732

2. For $T = 0.3$, $z_1 = 2 + j4$, $s_1 =$.....

   a) $5 - j3$ b) $5 + j3$ c) $-5 - j3$ d) $-5 + j3$

3. The solution of the difference equation $e(k+2) + e(k+1) - 2\,e(k) = (-1)^k$ for $e(0) = 0$ and $e(1) = 1$ is .....

   a) $\frac{1}{2} - \frac{1}{2}(-1)^k$ b) $\frac{1}{2} + \frac{1}{2}(-1)^k$ c) $1 - \frac{1}{2}(-1)^k$ d) $\frac{1}{2} - (-1)^k$

4. The system having characteristic equation $F(z) = z^3 + 1.2\,z^2 + 1.5\,z + 0.2 = 0$ is .....

   a) stable. b) unstable. c) critically stable. d) marginally stable.

For the system shown in Fig.1 assuming $T = 1$, answer questions 5 to 20

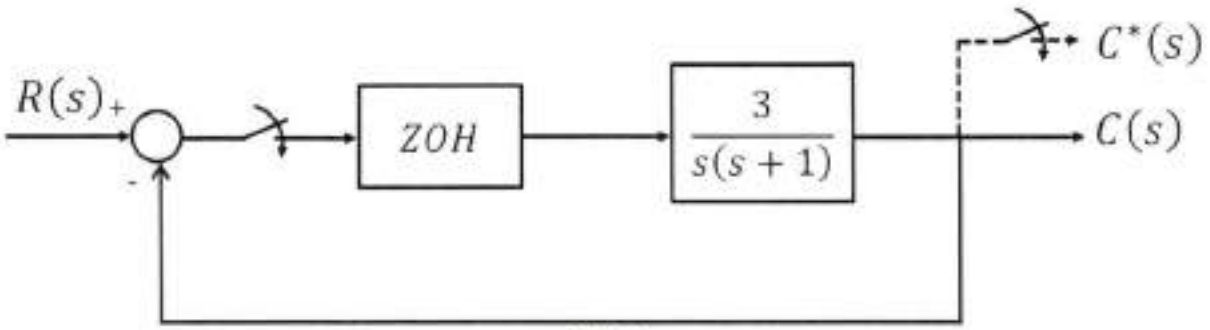


Fig.1

5. The transfer function of the ZOH is .....

   a) $\frac{1 - e^{-sT}}{s^2}$ b) $\frac{1 + e^{-sT}}{s}$ c) $\frac{1 - e^{-sT}}{s}$ d) $\frac{e^{-sT} - 1}{s}$

6. The pulse transfer function of the system assuming $G_1(s)$ is the transfer function of ZOH and $G_2(s) = \frac{3}{s(s+1)}$ is .....

   a) $\frac{G_1G_2(z)}{1+G_1G_2(z)}$ b) $\frac{G_1(z)G_2(z)}{1+G_1(z)G_2(z)}$ c) $\frac{G_1G_2(z)}{1+G_1(z)G_2(z)}$ d) $\frac{G_1(z)G_2(z)}{1+G_1G_2(z)}$

7. The numerator (البسط) of the previous question (Q6) is .....

   a) $\frac{0.368\,z+0.264}{z^2-1.368\,z+0.368}$ b) $\frac{0.368\,z+0.264}{z^2-0.246\,z+1.16}$ c) $\frac{1.104\,z+0.792}{z^2-0.246\,z+1.16}$ d) $\frac{1.104\,z+0.792}{z^2-1.368\,z+0.368}$

8. The overall pulse transfer function is .....

   a) $\frac{0.368\,z+0.264}{z^2-1.368\,z+0.368}$ b) $\frac{0.368\,z+0.264}{z^2-0.246\,z+1.16}$ c) $\frac{1.104\,z+0.792}{z^2-0.246\,z+1.16}$ d) $\frac{1.104\,z+0.792}{z^2-1.368\,z+0.368}$

9. **The roots of the characteristic equation are .....**

a) $0.123 \pm j1.07$ b) $0.5 \pm j0.618$ c) $0.123 \pm j0.618$ d) $0.5 \pm j1.07$

10. **For the discrete system, the value of ζ is .....**

a) 0.29 b) 0.05 c) 1.7 d) 1.45

11. **For the discrete system, the value of ω_n is .....**

a) 0.29 b) 0.05 c) 1.7 d) 1.45

12. **For the discrete system, the value of M_p is .....**

a) 0.16 b) 0.39 c) 0.85 d) 1.93

13. **For the discrete system, the value of t_s for 2% error is .....**

a) 8.11 b) 16.23 c) 55.17 d) 60.81

14. **For the discrete system, the value of t_p is .....**

a) 0.39 b) 1.93 c) 8.11 d) 2.17

15. **For the equivalent continuous system, the value of ζ is .....**

a) 0.29 b) 0.05 c) 1.7 d) 1.45

16. **For the equivalent continuous system, the value of ω_n is .....**

a) 0.29 b) 0.05 c) 1.7 d) 1.45

17. **For the equivalent continuous system, the value of M_p is .....**

a) 0.16 b) 0.39 c) 0.85 d) 1.93

18. **For the equivalent continuous system, the value of t_s for 2% error is .....**

a) 8.11 b) 16.23 c) 55.17 d) 60.81

19. **For the equivalent continuous system, the value of t_p is .....**

a) 0.39 b) 1.93 c) 8.11 d) 2.17

20. **The dynamics of the continuous system are ..... that of the equivalent discrete system.**

a) better than. b) worse than. c) similar to. d) equal to.

Best Wishes,

Dr. Eman M. El-Gendy

Sunday, 30/1/2022, 12:30 PM

Mansoura University
Faculty of Engineering
Biomedical Engineering Program.
Automatic Control Systems

Course: ECE252
Time allowed: ٢ Hours
Level 200 Term Exam
Total Score: ٥٠ Marks
Exam in Two Papers

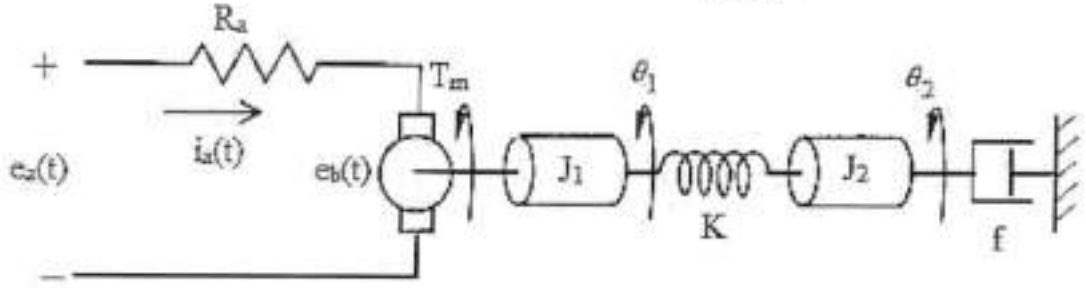
Attempt all questions assuming any missing data.

Question1 [17 Marks]

1. What are the types of control system? List the advantages and disadvantages of each type, illustrate your answer by examples? [4]

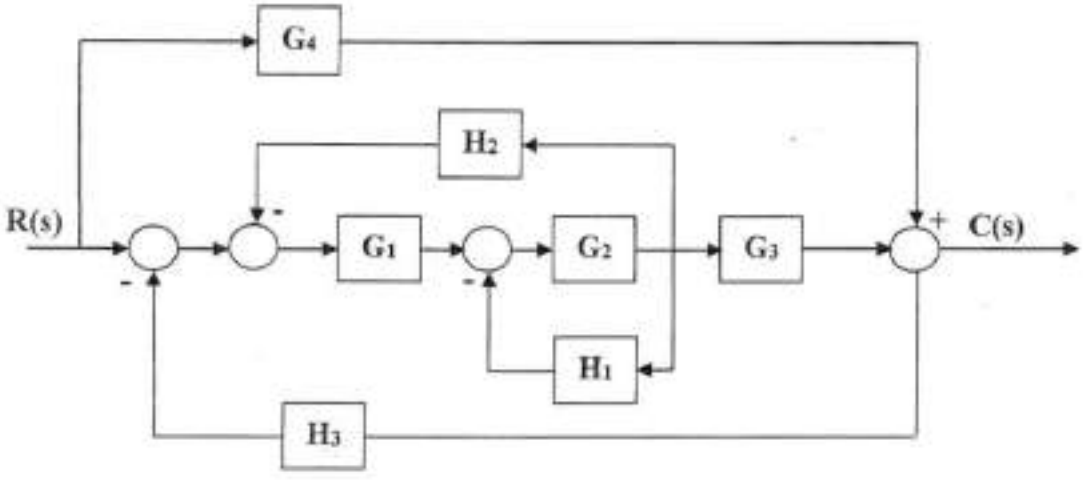
2. Solving the following differential equation:
$\ddot{y} - 10\dot{y} + 9y = 5t \qquad y(0) = -1,\ \dot{y}(0) = 2$ [5]

3. Find the transfer function of the following model $\frac{\theta_2(s)}{E_a(s)}$ [8]



Question2 [17 Marks]

1. Reduce the system shown to a single transfer function. [7]



2. Define the following terms: [4]
   a. Rise Time b. Maximum Overshoot c. Settling Time d. Peak Time

3. A control system has a forward transfer function $(\frac{K_1}{S^2})$ and a negative feedback transfer function $(1 + K_2S)$. Determine the values of K_1 and K_2 such that the maximum overshoot is 0.28 and peak time is 5 sec, for unit step input, then find settling time, rising time and draw the system output time response. **[6]**

Question3 **[16 Marks]**

1. For a system with

$$TF(s) = \frac{10}{s^5 + 7s^4 + 6s^3 + 42s^2 + 8s + 56}$$

Find the roots location of the system, and then decide the system stability. **[8]**

2. Draw the root loci of the following system: **[8]**

$$G(s)H(s) = \frac{K(s^2 - s + 1)}{s^2 + 3s + 3}$$

Then find range of K to make the system stable.

With my Best Wishes
Dr. Mohamed Moawad

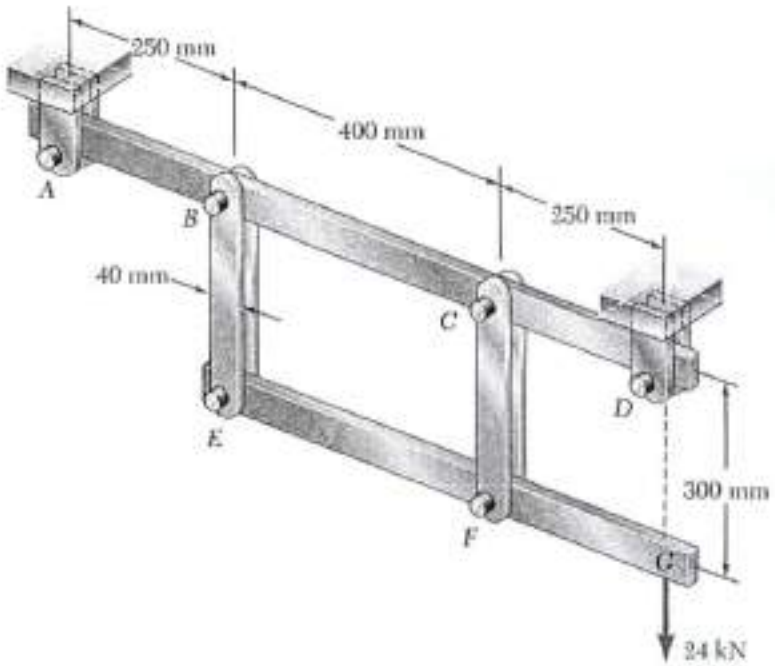
	Mansoura University Fac. of Engineering BME Program Level 100 (2 pages exam)		Strength of Materials PDE 161 Time allowed: 2 hours Full Mark: 50 Marks	
Final Exam (31-1-2022) – First Semester				

Problem (1): [10 Points]

Each of the four vertical links connecting the two rigid horizontal members is made of aluminum (E = 70 GPa) and has a uniform rectangular cross section of 10×40 mm.

Determine the following:

a) Stress on links BE.
b) Stress on links CF.
c) Deflection of point G.

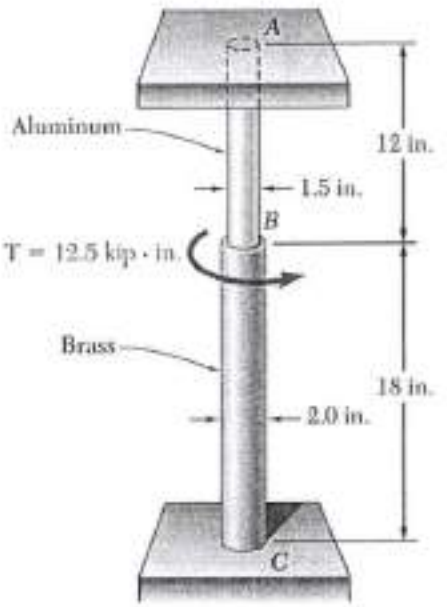


Problem (2): [10 Points]

The solid cylinders AB and BC are bonded together at B and are attached to fixed supports at A and C. The modulus of rigidity is 3.7×10^6 psi for aluminum and 5.6×10^6 psi for brass.

Determine the maximum shearing stress for:

a) Cylinder AB.
b) Cylinder BC.

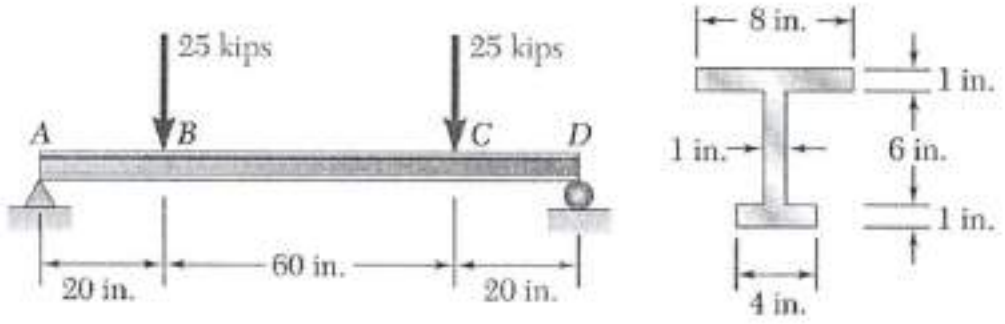


Problem (3): [15 Points]

Two vertical forces are applied to a beam of the cross section shown.

You are required to:

a) Draw the shear force diagram.
b) Draw the bending moment diagram.
c) Determine the maximum tensile stress and its location.
d) Determine the maximum compressive stress and its location.

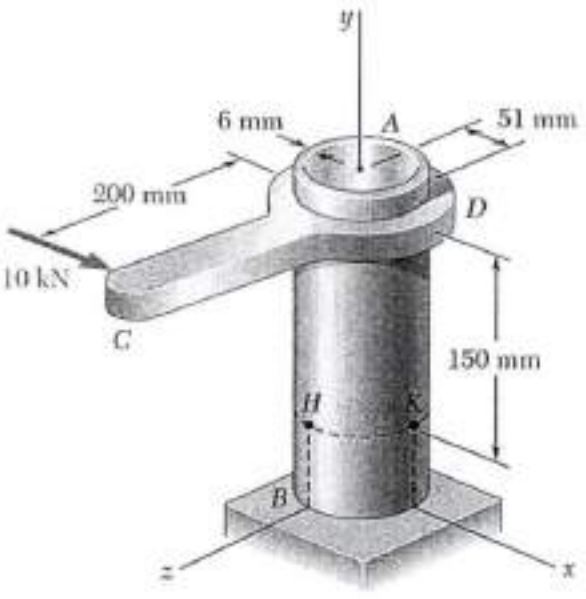


Problem (4): [15 Points]

The steel pipe AB has a 102 mm outer diameter and a 6 mm wall thickness. The arm CD is rigidly attached to the pipe.

For point K, determine the following:

a) Principal stresses.
b) Maximum shearing stress.



With all of our best wishes

Prof. Dr. Noha Fouda

Dr. Mostafa ElBahloul

	Mansoura University Fac. of Engineering BME Program Level 100 (2 pages exam)		Strength of Materials PDE 161 Time allowed: 2 hours Full Mark: 50 Marks	
Final Exam (31-1-2022) – First Semester				

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Determine the following:

a) Stress on links BE.
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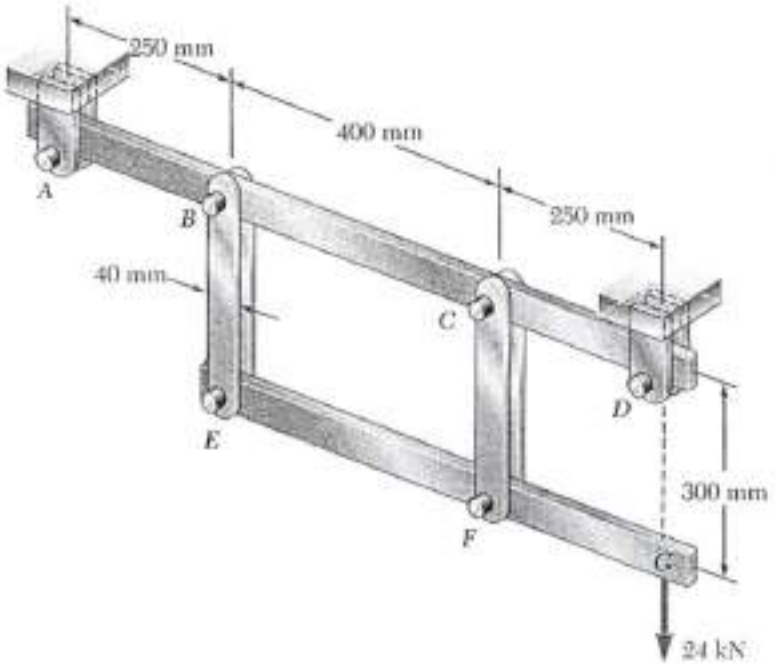

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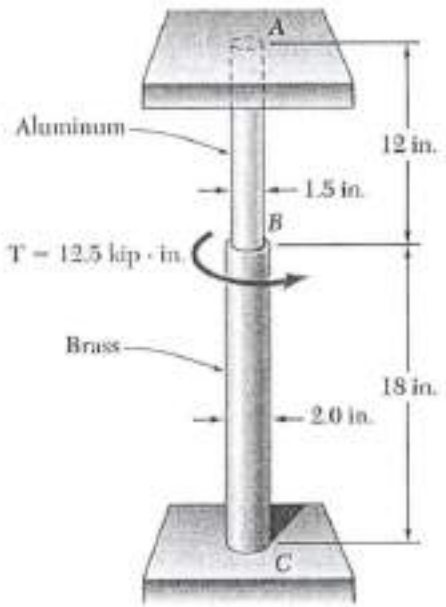

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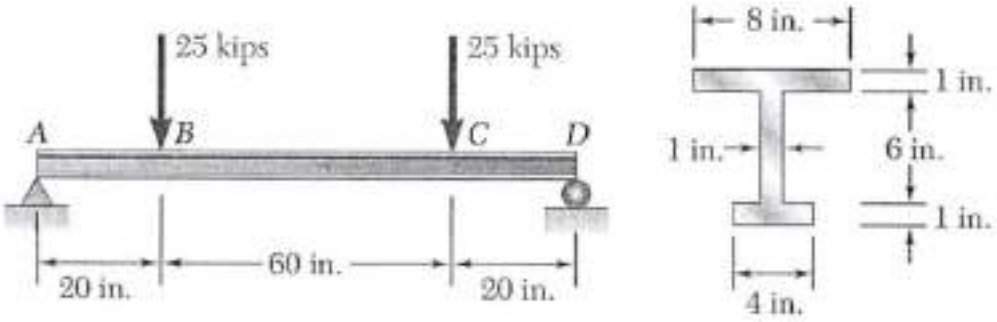

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For point K, determine the following:

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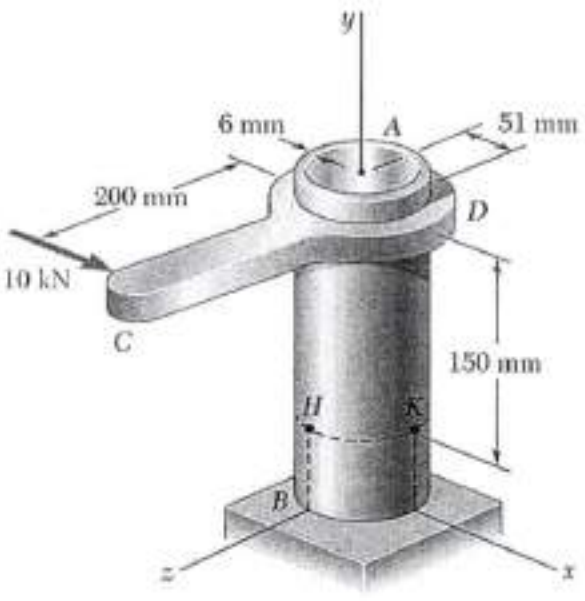
b) Maximum shearing stress.



With all of our best wishes

Prof. Dr. Noha Fouda

Dr. Mostafa ElBahloul

Mansoura University
Faculty of Engineering
Biomedical Engineering Dept.
Bioinformatics (CSE 493)

Level 400 students (Elective)
1st term Final Exam
Time allowed: 2 hrs
Total marks [50]

تأكد من وجود اسمك كاملا على نموذج الاجابة. 2 pages (2 faces) الامتحان ورقتان (وجهان)

Question 1: Choose the most appropriate answer (ONLY ONE):

1- Discriminating the i/p data within object population via the search for invariant attributes among members of the population is ...

A) Classification	B) Transducer	C) Multilayer	D) Pattern

2- The set of input training vectors is as follows:

$x_1 = \begin{bmatrix} 1 \\ -2 \\ 0 \\ -1 \end{bmatrix}$, $x_2 = \begin{bmatrix} 0 \\ 1.5 \\ -0.5 \\ -1 \end{bmatrix}$, $x_3 = \begin{bmatrix} -1 \\ 1 \\ 0.5 \\ -1 \end{bmatrix}$ If w^2 is assumed = |1 -1 0 0.5|

$d_1 = -1$, $d_2 = -1$, and $d_3 = 1$, $c = 0.1$ use discrete perceptron learning rule, Find the second output after activation:

A) - 2	B) - 1	C) Sgn 2	D) Sgn (1.6)

3- For the previous problem, the value of w^3 = ?

A) |0.8 -0.6 0 0.7|^t	B) |1 -1 0 0.5|	C)	0.6 -0.4 0.1 0.5|	D)	-0.6 0.4 0.1 0.5|

4- Learning algorithms for training ANN differ in the way of changing .....

A) Weight	B) Learning constant	C) ζ	D) Dataset

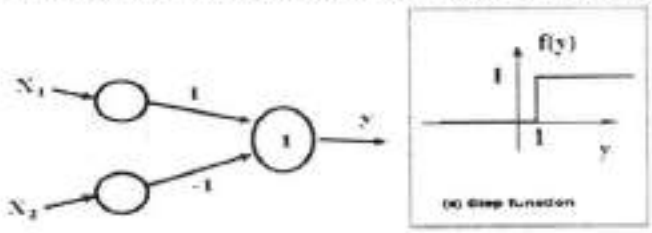
5- In gradient descent algorithm, the change in learning parameters Δw is ..... proportional to the change in error E.

A) Negatively	B) Inversely	C) directly	D) A and C

6- We can use a ..... as an external input to a neuron to adjust its output

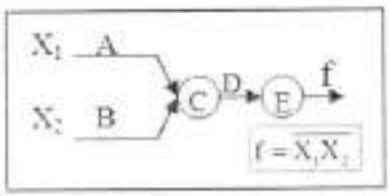
A) Bias	B) Vector	C) logic gate	D) weight value

7- Which logic function does the following network realize:



A) $X_1' X_2'$	B) $X_1 X_2$	C) $X_1' X_2$	D) $X_1 X_2'$

8- For the Mcculloch-Pitts neuron model neuron model shown in fig., to get the function $F = (X_1 X_2)'$ the weights and thresholds A,B,C,D,E should be:



A) 1, 1, 1,-1, 0	B) -1, 1.1,1,1	C) 1, 0.1,1,1	D) 1, 1, 2,-1, 0

9- A neuron with 3 inputs has the weight vector |0.2 -0.1 0.1|^t and a bias = 0. If the input vector is X = |0.2 0.4 0.2|^t with a SIGMOID activation function(λ=1), then the total output to the neuron is:

A. 0.5	B. 0.02	C. 1.98	D. No answer

10- When representing logic gates using neurons, the most suitable activation function is .....

A) Sigmoid	B) Step	C) Linear	D) bipolar sigmoid

11- Artificial neural networks are capable of:

A) Noise filtration	B) Parallel computations	C) Learning ability	D) all answers are correct

Mansoura University
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12- In ..... learning, net errors are used to adapt weights.

A) Supervised	B) Unsupervised	C) Reinforcement	D) All answers are correct

13- Why is the XOR problem exceptionally interesting to neural network researchers?
A. Because it can be expressed in a way that allows you to use neural network.
B. Because it is the simplest linearly inseparable problem that exists.
C. Because it is complex binary operation that cannot be solved by neural networks.
D. Because it can be solved by a single layer perceptron.

14- The adjustment for single weight in Widrow-Hoff learning rule can be calculated from:

A)	B)	C)	D) A or C
$\Delta w_{ij} = \eta (d_i - O_i) f'(w_i^t x) x_j$	$\Delta w_{ij} = \eta (d_i - O_i) x_j$	$\Delta w_{ij} = \eta O_i x_j$	

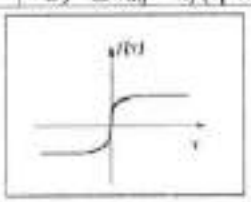
15- In ..... learning, the only adjusted weights are those of the winning neuron's connections.

A) Hebbian	B) Winner Takes All	C) Widrow-Hoff	D) Perceptron

16- If neuron m wins the competition between all neurons in competitive learning, it is then updated using :

A) $\Delta w_{mj} = \eta(x_j - w_{mj})$	B) $\Delta w_{mj} = x_j (\eta - w_{mj})$	C) $\Delta w_{mj} = \eta(x_j * w_{mj})$	D) $\Delta w_{ij} = \eta O_i x_j$

17- This function is called:



A) Bipolar binary	B) Bipolar sigmoid	C) Unipolar sigmoid	D) Unipolar binary

18- The equation representing the previous activation function (in question 17) is:

A) $f(x) = (1-e^{-\lambda x})/(1+e^{-\lambda x})$	B) $f(x) = 1/(1+e^{-\lambda x})$	C) $f(x) = sgn(x)$	D) $f(x) = (1+e^{-\lambda x})/(1-e^{-\lambda x})$

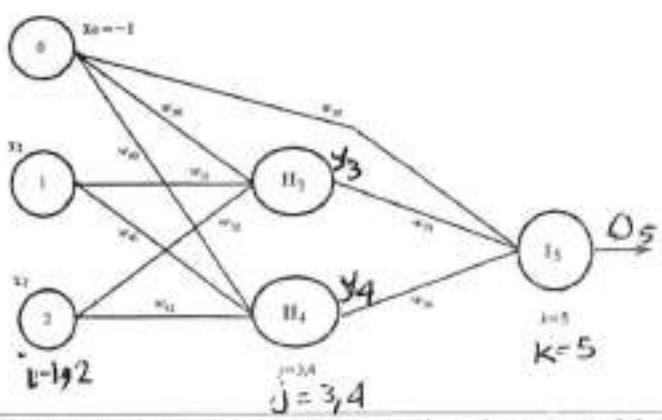
19- Negative product between the incoming spike and the corresponding synaptic weight; If impulses were less than threshold and hinder neuron firing.

A) Excitation	B) Inhibition	C) Synaptic strength	D) Objective

20- In ..... learning , the delay incurred in the generation of the primary signal implies that the machine must solve a temporal credit assignment problem

A) Supervised	B) Unsupervised	C) Reinforcement	D) A or B

21- A training pattern, consisting of an input vector $x = [x_0\ x_1\ x_2]t$ and desired outputs $d = [d_3\ d_4\ d_5]^t$, is presented to the following neural network. C is the learning constant. What is the usual sequence of events for training the network using the backpropagation algorithm?



A. (1) calculate $y_j = f(H_j)$, (2) calculate $O_5 = f(I_5)$, (3) update w_{j5}, (4) update w_{kj}.

B. (1) calculate $y_j = f(H_j)$, (2) update w_{j5}, (3) calculate $O_5 = f(I_5)$, (4) update w_{kj}.

C. (1) calculate $O_5 = f(I_5)$, (2) update w_{kj}, (3) calculate $y_j = f(H_j)$, (4) update w_{ji}.

D. (1) calculate $y_j = f(H_j)$, (2) calculate $O_5 = f(I_5)$, (3) update w_{kj}, (4) update w_{ji}.

22- For the network in previous question, the output of the first hidden neuron y_3 will be

A. $f(x_3w_{43}+x_2w_{42}-w_{40})$	B. $f(x_1w_{31}+x_2w_{32}-w_{30})$	C. $f(x_1w_{31}+x_2w_{32}+w_{30})$	D. $f(y_3w_{53}+y_4w_{54}-w_{50})$

23- For the network in previous question, the output of the final neuron O_5 will be

A. $f(x_3w_{43}+x_2w_{42}-w_{40})$	B. $f(x_1w_{31}+x_2w_{32}-w_{30})$	C. $f(x_1w_{31}+x_2w_{32}+w_{30})$	D. $f(y_3w_{53}+y_4w_{54}-w_{50})$

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24- For a unipolar sigmoid function, the error signal term for O_5 can be calculated from:

A. $(d_5 - o_5)o_5(1-o_5)$	B. $0.5\,(d_5 - o_5)(1- o_5^2)$	C. $o_5(1-o_5)\delta_5 W_{43}$	D. $o_5(1-o_5)\delta_5 W_{53}$

25- For a unipolar sigmoid function, the error signal term for y_3 can be calculated from:

A. $(d_3 - o_5)o_3(1-o_3)$	B. $0.5\,(d_3 - o_3)(1- o_3^2)$	C. $o_3(1-o_3)\delta_5 W_{53}$	D. $o_3(1-o_3)\delta_5 (W_{43} + W_{53})$

26- The adjustments of hidden-layer weight ΔW_{32} can be computed from

A. $C\,\delta_3 X_2$	B. $-C\,\delta_4$	C. $C\,\delta_4 X_1$	D. $C\,\delta_3 y_3$

27- The adjustments of output-layer weight ΔW_{53} can be computed from

A. $C\,\delta_3 X_2$	B. $-C\,\delta_4$	C. $C\,\delta_4 X_1$	D. $C\,\delta_5 y_3$

28- The cumulative cycle error is computed for the complete training cycle from

A. $0.5\sum_{k=1}^{K}(d_{pk} - o_{pk})^2$	B. $(d_{pk} - o_{pk})$	C. $0.5\sum_{k=1}^{K}(d_{pk} - o_{pk})$	D. $(d_{pk} - O_{pk})^2$

29- In error back-propagation algorithm, after one complete training cycle, you need to :

A. Set cycle error = 0	B. Test for more patterns in the training set.	C. Test if final cycle error is below the upper bound, E_{max}	D. If B is yes then C is next

30- Which of the following is true?
i. On average, neural networks have high computation rate due to parallel processing.
ii. A single Perceptron can represent all logic gates.
iii. Neural networks mimic the way the human brain works.

A. i, ii, iii are true.	B. ii and iii are true	C. i, iii are true.	D. None of the answers.

31. Which of the following is not the promise of Artificial Neural Network?

A. It can survive the failure of some nodes	B. It can explain results.	C. It has inherited parallelism.	D. It can handle noise.

32. Neural Networks are complex ..... With many parameters.

A. Exponential Functions.	B. Linear Functions.	C. Discrete Functions.	D. Nonlinear Functions.

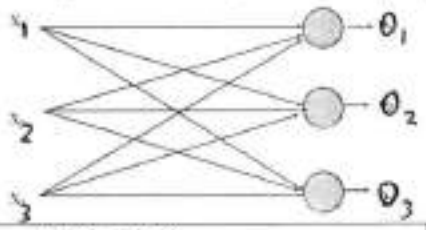
33. What is the credit assignment problem in the training of multi-layer feedforward networks?

A. The problem of adjusting the weights for the output layer.	B. The problem of defining an error function for linearly inseparable problems.	C. The problem of avoiding local minima in the error function.	D. The problem of adjusting the weights for the hidden layers.

34. Regions where no class membership of an input pattern can be uniquely determined based on the response of the classifier.

A. Decision boundaries	B. Indecision regions	C. Decision hyperplane	D. All

35. The weight vectors of three processing units are given as follows:
$w_1 = [-1 \;\; -1.5 \;\; 0.5]^t$ $w_2 = [2 \;\; -2 \;\; 5.2]^t$ $w_3 = [1.5 \;\; 6 \;\; 4.3]^t$
An input vector $x = [-1.4 \;\; 2.3 \;\; 0.2]$ is presented to the network. The winning neuron has an output =



A. O3 = 12.56	B. O1 = 12.12	C. O1 = 6.3	D. No answer

36. Adapt the weight vector of the winning unit in previous question with a learning rate of 0.5. What is the new weight vector?

A. $w_{winner} = [-2.7 \;\; 4.65 \;\; 0.4]^t$	B. $w_{winner} = [0.3 \;\; 0.15 \;\; 2.7]^t$	C. $w_{winner} = [-1.2 \;\; 0.4 \;\; 0.35]^t$	D. $w_{winner} = [0.05 \;\; 4.15 \;\; 2.25]^t$

37. Widrow & Hoff learning law is a special case of ?

A. Hebbian learning law	B. Perceptron learning law.	C. Delta learning law.	D. None of the answers

Mansoura University
Faculty of Engineering
Biomedical Engineering Dept.
Bioinformatics (CSE 493)

Level 400 students (Elective)
1st term Final Exam
Time allowed: 2 hrs
Total marks [50]

38. What are the three essential components of a learning system?

A) Model, gradient descent, learning algorithm
B) Objective function, model, learning algorithm
C) Accuracy, Sensitivity, Specificity
D) Model, objective function, cost function

39. Teacher directs training with the exact target ONLY in ..... learning.

A. Supervised	B. Un supervised	C. Reinforcement	D. A or C

40. It Perceives its environment through sensors and acting upon that environment through actuators

A. Sensor	B. Agent	C. Actuator	D. Observation

41. It performs precisely defined tasks with speed and accuracy but lacks understanding and reasoning.

A. Human	B. Computer	C. Robot	D. B or C

42. Weak AI is:

A. The embodiment of human intellectual capabilities within a computer.	B. A set of computer programs that produce output that would be considered to reflect intelligence if it were generated by humans.
C. Operations of this system are based on predefined algorithms dedicated to solving a specific problem & easy to predict its outcome.	D. A or B

43. The weights of the ANN to be trained are typically initialized at .....values.

A. Small statistical	B. Small random	C. Large statistical	D. Large random

44. In reinforcement learning?

A. Delay in response is a problem	B. Inputs come from sensors	C. Dataset are predefined	D. A or B

45. Which machine learning phase where rules are used in responding to some new situation.

A. Training	B. Validation	C. Application	D. A and B

46. Indecision regions can appear in ..... classifier.

A. Dichotomizer	B. Multicategory	C. Binary	D. A or C

47. Number of needed perceptron for a multiclass classifier can be found by.....

A. R(R-1) / 2	B. 2 R/ (R-1)	C. R(R-1)	D. (R-1)/2

48. .....perceptron always lead to a solution for linearly separable problems while .....perceptron doesn't guarantee that.

A. Continuous/ discrete	B. Discrete / continuous	C. Discrete / binary	D. Continuous/ binary

49. Weights are updated by $\Delta w = 0.5\, c\, (d - o)(1- o^2)X$ in case of.....function, and ..... rule.

A. Bipolar continuous / Delta	B. Bipolar continuous / Hebbian	C. Unipolar continuous / Perceptron	D. Bipolar binary / Delta

50. ..... is a class assignment for i/p patterns that are not identical used for training the classifier.

A. Classification	B. Discrimination	C. Recognition	D. Perception

Prof. Amira Yassien Haikal , 31 Jan 2022
Head of computers and control systems eng. Dept.

Mansoura University
Faculty of Engineering
BME Program .
Level 400
Fall Semester 2021

Course Title: Project Management
Course Code: UNC 448
Final Exam (11 Pages) Model No.1
Due Date: 2 Feb. 2022
Time Allowed: 2 Hr. Marks: 50

PLEASE ENSURE YOU FILL THE CIRCLE REPRESENTING YOUR ANSWER VERY CLEARLY WITH SOLID BLACK OR BLUE INK PEN

Question 1: (32 points) Choose The Correct Answer – 0.5 points per question

1. Which of the following defines what tasks the project resources are expected to accomplish and, just as importantly, what is not part of the project team's responsibilities?
   a. Check sheet
   b. Project logic diagram
   c. Checklist
   d. Scope document

2. The entire process of a project may be considered to be made up on number of sub process placed in different stage called the
   a. Technical key resources
   b. Work key structure
   c. Work Breakdown Structure (WBS).
   d. None of the above

3. Which of these is not one of the constraints of a project?
   a. Scope
   b. Resources
   c. Team
   d. Budget

4. Which of the following is not correct about initial phase of a project?
   a. The cost associated at the beginning of the project is highest.
   b. Stakeholders have maximum influence during this phase
   c. The highest uncertainty is at this stage of the project.
   d. All the above statements are correct.

5. The project you are managing has nine stakeholders. How many channels of communications are there between these stakeholders?
   a. 9
   b. 8
   c. 45
   d. 36

6. Which of the following is not an example of formal communication?
   a. Contract
   b. email
   c. Project status report
   d. Status meeting

7. A Project with a total funding of $100,000 finished with a BAC value of $95,000. What term can BEST describe the difference of $5,000?
   a. Cost Variance
   b. Management Overhead
   c. Management Contingency Reserve
   d. Schedule Variance

8. Ahmed is actively initiating a project, so he plans to invite all relevant internal and external stakeholders including sponsors, customers, project teams, etc. for a kick-off meeting. To ensure all of them are covered in the stakeholder register, which document is the most helpful for Ahmed to look at? Select one
   a. Project team activities
   b. Scope statement
   c. Project charter
   d. Work packages

9. Petri is working for Nokia in Finland. He has completed 10 months of his 12-month project, budgeted at $800,000. His earned value analysis shows that variance at completion is $75,000. What is the estimate at completion value for this project?
   a. 725,000
   b. -725,000
   c. -$875,000
   d. $875,00

10. Fill in the blanks. It is during the _____ phase that the decision should be made regarding whether the project should continue. During this phase, _____ must be considered and weighed against the potential benefit of the project's success.
   a. closeout, resources
   b. execution, performance
   c. planning, timing
   d. initiation, risk

11. Activity Definition is typically performed by which of the following:
   a. Project Manager who created the WBS
   b. Project Officer
   c. Project Team Members responsible for the work package
   d. Project Stakeholder

12. Which of the following does NOT generate changes to the Project documents?
   a. Define Activities
   b. Sequence Activities
   c. Estimate Activity Resources
   d. Estimate Activity Durations

13. Risk must be considered in the _____ phase and weighed against the potential benefit of the project's success in order to decide if the project should be chosen.

a. closeout
b. execution
c. planning
d. initiation

14. If capital is to be rationed *for only the current period,* a firm should probably first consider selecting projects by descending order of ____.
a. net present value
b. payback period
c. internal rate of return
d. profitability index

15. "Risk" is usually _____ as the project progresses.
a. Increases
b. Reduces
c. remains same
d. becomes negligible

16. Assembling project team and assigning their responsibilities are done during which phase of a project management?
a. Initiation
b. Planning
c. Execution
d. Closure

17. How the project work will be carried out, monitored, and controlled? These questions are ed in which phase of the project management?
a. Initiating
b. Planning
c. Executing
d. Closing

18. According to the Project Management Institute (PMI), project management is defined as "the application of knowledge, _____, _____, and techniques to project activities to meet the project requirements".
a. skills, analysis
b. tools, analysis
c. analysis, theories
d. skills, tools

19. The review of the successes and the mistakes is normally held during ____phase.
a. initiation
b. planning
c. execution
d. closure

20. An uncertain event or condition that, if it occurs, has a positive or negative effect on a project objectives is termed.
a. Random chance
b. A disaster
c. Risk
d. Hazard

21. A ____ is a set of activities which are networked in an order and aimed towards achieving the goals of a project.
a. Project
b. Process
c. Project management
d. Project cycle

22. Developing a technology is an example of

a. Process
b. Project
c. Scope
d. All of the above

23. What are the stages of the Project Life Cycle?

a. Initiation, testing, doing & Evaluating
b. Initiation, Planning , Execution, Evaluation
c. Analysis, Planning, Execution, Evaluation
d. Miles, Initiation, doing & Evaluating

24. Developing a technology is an example of

a. Process
b. Project
c. Scope
d. All of the above

25. The project life cycle consists of

a. Understanding the scope of the project
b. Objectives of the project
c. Formulation and planning various activities
d. All of the above

26. Project performance consists of

a. Time
b. Cost
c. Quality
d. All of the above

27. The entire process of a project may be considered to be made up on number of sub process placed in different stage called the

a. Technical key resources
b. Work key structure
c. Work Breakdown Structure (WBS).
d. None of the above

28. "Devising and maintaining a workable scheme to accomplish the business need" is

a. Initiating process
b. Planning process
c. Executing process
d. Controlling process

29. Controlling the changes in the project may affect

a. The progress of the project
b. Stage cost
c. Project scope
d. All of the above

30. Which of the following is a common multicriteria selection model?

a. Checklist
b. Net Present Value
c. Weighted criteria model
d. Both A and C are correct

31. The particular task performance in CPM is known

a. Dummy
b. Event
c. Activity
d. Contract.

32. The earliest start time rule

a. Compares the activities starting time for an activity successor.
b. Compares the activities end time for an activity predecessor.
c. Directs when a project can start.
d. Regulates when a project must begin.

33. The critical path

a. Is a path that operates from the starting node to the end node
b. Is a mixture of all paths.
c. Is the longest path
d. Is the shortest path

34. Completion of a CPM network diagram activity is commonly known

a. Connector
b. Event
c. Node
d. All the above.

35. Activities A, B, and C are the immediate predecessors for Y activity. If the earliest finish times for the three activities are 12, 15, and 10, then the earliest start time for Y will be

a. 10
b. 15
c. 12
d. Cannot be determined

36. Activities P, Q and R instantly follow activity M, and their current start times are 12, 19, and 10. Therefore, the latest finish time for activity M is

a. 11
b. 10
c. 18
d. Cannot be determined

37. PERT analysis is based on

a. Optimistic time
b. Pessimistic time
c. Most likely time
d. All the above.

38. A project has three independent critical paths A, B and C. To reduce the project length, we have to shorten

a. The activities of A
b. The activities of B
c. The activities of C
d. The activities of A, B, and C simultaneously.

39. Pick up the correct statement from the following:

a. Total slack is the difference between its late start and early start times
b. Total slack is the difference between its late finish and early finish times
c. The activities on the critical path have zero total slack
d. All the above.

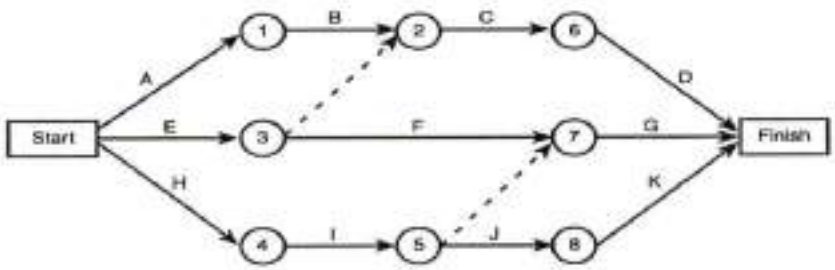
40. When developing a project's scope statement, which of the following should not be included?

a. Project justification.
b. Cost/benefit analysis
c. Project deliverables
d. Measurable objectives

41. PERT analysis is based on

a. Optimistic time
b. Pessimistic time
c. Most likely time
d. All the above

42. In the Given Project Network Diagram, Activity C is _____ of Activity D.



a. Predecessor Activity
b. Successor Activity
c. Dependent Activity
d. Follower Activity

43. Which of the option is not a notable challenge while scheduling a project?

a. Deadlines exist.
b. Independent activities.
c. Too many workers may be required.
d. Costly delay

44. The particular task performance in CPM is known

a. Dummy
b. Event

c. Activity
d. Contract.

45. The earliest start time rule
a. Compares the activities starting time for an activity successor.
b. Compares the activities end time for an activity predecessor.
c. Directs when a project can start.
d. Regulates when a project must begin

46. PERT analysis is based on
a. Optimistic time
b. Pessimistic time
c. Most likely time
d. All the above.

47. If D is the duration, ES and EF are the earliest start and finish, LS and LF are latest start and latest finish time, then the following relation holds good
a. EF = ES + D
b. LS = LF - D
c. LF = LS + D
d. all the above.

48. The difference between the time available to do a job and the time required to do the job, is known as
a. event
b. float
c. duration
d. constraint.

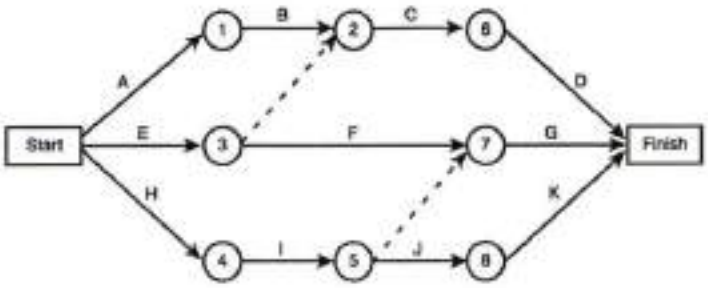
49. If TL is the latest allowable event occurrence time, total activity slack(s), is equal to
a. LST-EST
b. LFT- EFT
c. TL-EFT
d. all the above.

50. The critical activity has
a. maximum float
b. minimum float
c. zero float
d. none of these.

51. The time by which activity completion time can be delayed without affecting the start of succeeding activities, is known as
a. duration
b. total flat
c. free float
d. interfering float.

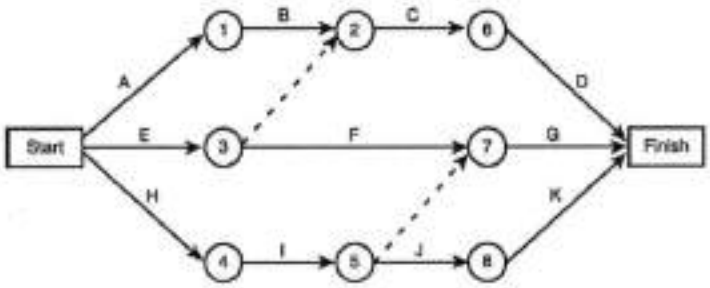
52. Which of the following is a characteristic of any projects?
a. They are simple and routine business activities
b. They do not have a clear goal or set of goals
c. They have unlimited budget, schedule and resources
d. They are customer focused

53. Observing the Given Project Network Diagram, Select the correct Statement.



a. Activity connecting Node 3 and Node 2 is a Dummy activity.
b. Activity B is Predecessor activity for Activity A
c. Activity connecting Node 3 and Node 7 is a Dummy activity.
d. There are 4 Dummy activities involved in the Network diagram.

54. In the Given Project Network Diagram, Identify the Successor Activity for Activity C :



a. Activity B
b. Activity A
c. Activity D
d. Activity F

55. A Dummy Activity is the one which:

a. Consumes time and Resources
b. Does not Consume any time and Resources
c. Consumes time but does not consume Resources
d. Consume human Resources

56. Project Network Analysis helps the project Manager to:

a. Maximize the Project Cost
b. Prepare the Project Charter
c. Define Project Scope
d. Optimum Utilization of Resources

57. The value of FLOAT for any Critical Activity is:

a. Always equal to ZERO
b. Always equal to One
c. Always Greater than One
d. Always between Zero and One

58. CRITICAL PATH is the _____ Path in the Project Network.

a. Longest
b. Shortest
c. Less Resources consuming
d. Independent

59. For a certain activity, the time estimates in days are: Optimistic Time=2, Most Likely Time=5 and Pessimistic Time=8. Determine the Expected Time for activity.

a. 5 days
c. 6 days
b. 4 days
d. 8 days

60. The span of time within which the investment made for the project will be recovered by the net returns of the project is known as

a. Period of return
c. Span of return
b. Payback period
d. None of the above

61. The town of Podunk is considering building a new downtown parking lot. The land will cost $25,000 and the construction cost of the lot is estimated to be $150,000. Each year costs associated with the lot are estimated to be $17,500. The income from the lot is estimated to be $18,000 the first year and increase by $3,500 each year for the twelve year expected life of the lot. Determine the B/C ratio if Podunk uses a cost of money of **4%**.

a. 0.393 min
c. 0.990 min
b. 1.933 min
d. 0.339 min

62. A horizontal bar chart that shows project tasks against a calendar is called

a. Milestone
c. Gantt chart
b. Goal
d. PERT chart

63. The statistical tool that depicts a project's tasks and the relationships between those tasks is known as

a. Milestone
c. Gantt chart
b. Goal
d. PERT chart

64. Company C is planning to undertake another project requiring initial investment of $50 million and is expected to generate $10 million net cash flow in Year 1, $13 million in Year 2, $16 million in year 3, $19 million in Year 4 and $22 million in Year 5. Calculate the payback period of the project.

a. $\cong 3.60\ year$
c. $\cong 4.20 ear$
b. $\cong 1.36\ year$
d. $\cong 2.50 year$

Question 2: (6 points) Choose The Correct Answer - 2 points per question

Consider project *A* and *B*. Which project would you approve if the income of both were the same? The expected period of service is 15 years, and interest rate is **10%**.

	Project *A*	Project *B*
Initial cost	$50,000	$75,000
Annual operating costs	15,000	10,000
Annual repair costs	5,000	3,000
Salvage value after 15 years	5,000	10,000

1. The Present Worth of project A
   a. −$200,925
   b. −$125,000
   c. −$320,225
   d. −$175,920
2. The Present Worth of project B
   a. −$200,488
   b. −$71,488
   c. −$171,488
   d. −$450,000
3. The decision is to .
   a. Choose project A
   b. Choose project B
   c. Reject project A and B
   d. Do Nothing

Question 3: (12 points) Choose The Correct Answer - 3 points per question

An activity list of a project is shown in the table below:

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Time (days)	9	3	4	5	8	4	1	4	12	6	4	3
Predecessor	-	A	-	C	A,D	-	F	-	C	B,E,F,G	H,I,J	K

1. What is the project completion time

a. 27 days
b. 36 days
c. 30 days
d. 18 days

2. The critical path is

a. A→D→E→J→K→L
b. C→I→ K→L
c. C→D→E→J→K→L
d. F→G→ J→K→L

3. Tabulate the ES, EF, LS, LF, and flow time for "I" Activity.

a. 4, 16, 11, 23 and 7
b. 4, 0, 4, 12, 16 and 7
c. **c. 4, 0, 4, 19, 23, and 17**
d. **d. 6, 17, 27, 17,and 7**

4. The detailed progress report at the end of the 12th day.

a. C, D, F, G, and H are finished and E&K still running
b. C, B, E, F, G, and H are finished and I&J still running
c. A, B, C, D, F, G, and H are finished and E&I still running
d. A, B, C, D, F, G, and H are finished and E&L still running

"Where there is a will, there is a way."

Dr. Mona Abou-Eleaz

10% Compound Interest Factors 10%

	Single Payment		Uniform Payment Series				Arithmetic Gradient		
n	Compound Amount Factor Find *F* Given *P* *F/P*	Present Worth Factor Find *P* Given *F* *P/F*	Sinking Fund Factor Find *A* Given *F* *A/F*	Capital Recovery Factor Find *A* Given *P* *A/P*	Compound Amount Factor Find *F* Given *A* *F/A*	Present Worth Factor Find *P* Given *A* *P/A*	Gradient Uniform Series Find *A* Given *G* *A/G*	Gradient Present Worth Find *P* Given *G* *P/G*	n
1	1.100	.9091	1.0000	1.1000	1.000	0.909	0	0	1
2	1.210	.8264	.4762	.5762	2.100	1.736	0.476	0.826	2
3	1.331	.7513	.3021	.4021	3.310	2.487	0.937	2.329	3
4	1.464	.6830	.2155	.3155	4.641	3.170	1.381	4.378	4
5	1.611	.6209	.1638	.2638	6.105	3.791	1.810	6.862	5
6	1.772	.5645	.1296	.2296	7.716	4.355	2.224	9.684	6
7	1.949	.5132	.1054	.2054	9.487	4.868	2.622	12.763	7
8	2.144	.4665	.0874	.1874	11.436	5.335	3.004	16.029	8
9	2.358	.4241	.0736	.1736	13.579	5.759	3.372	19.421	9
10	2.594	.3855	.0627	.1627	15.937	6.145	3.725	22.891	10
11	2.853	.3505	.0540	.1540	18.531	6.495	4.064	26.396	11
12	3.138	.3186	.0468	.1468	21.384	6.814	4.388	29.901	12
13	3.452	.2897	.0408	.1408	24.523	7.103	4.699	33.377	13
14	3.797	.2633	.0357	.1357	27.975	7.367	4.996	36.801	14
15	4.177	.2394	.0315	.1315	31.772	7.606	5.279	40.152	15
16	4.595	.2176	.0278	.1278	35.950	7.824	5.549	43.416	16
17	5.054	.1978	.0247	.1247	40.545	8.022	5.807	46.582	17
18	5.560	.1799	.0219	.1219	45.599	8.201	6.053	49.640	18
19	6.116	.1635	.0195	.1195	51.159	8.365	6.286	52.583	19
20	6.728	.1486	.0175	.1175	57.275	8.514	6.508	55.407	20
21	7.400	.1351	.0156	.1156	64.003	8.649	6.719	58.110	21
22	8.140	.1228	.0140	.1140	71.403	8.772	6.919	60.689	22
23	8.954	.1117	.0126	.1126	79.543	8.883	7.108	63.146	23
24	9.850	.1015	.0113	.1113	88.497	8.985	7.288	65.481	24
25	10.835	.0923	.0102	.1102	98.347	9.077	7.458	67.696	25
26	11.918	.0839	.00916	.1092	109.182	9.161	7.619	69.794	26
27	13.110	.0763	.00826	.1083	121.100	9.237	7.770	71.777	27
28	14.421	.0693	.00745	.1075	134.210	9.307	7.914	73.650	28
29	15.863	.0630	.00673	.1067	148.631	9.370	8.049	75.415	29
30	17.449	.0573	.00608	.1061	164.494	9.427	8.176	77.077	30
31	19.194	.0521	.00550	.1055	181.944	9.479	8.296	78.640	31
32	21.114	.0474	.00497	.1050	201.138	9.526	8.409	80.108	32
33	23.225	.0431	.00450	.1045	222.252	9.569	8.515	81.486	33
34	25.548	.0391	.00407	.1041	245.477	9.609	8.615	82.777	34
35	28.102	.0356	.00369	.1037	271.025	9.644	8.709	83.987	35
40	45.259	.0221	.00226	.1023	442.593	9.779	9.096	88.953	40
45	72.891	.0137	.00139	.1014	718.905	9.863	9.374	92.454	45
50	117.391	.00852	.00086	.1009	1 163.9	9.915	9.570	94.889	50
55	189.059	.00529	.00053	.1005	1 880.6	9.947	9.708	96.562	55
60	304.482	.00328	.00033	.1003	3 034.8	9.967	9.802	97.701	60
65	490.371	.00204	.00020	.1002	4 893.7	9.980	9.867	98.471	65
70	789.748	.00127	.00013	.1001	7 887.5	9.987	9.911	98.987	70
75	1 271.9	.00079	.00008	.1001	12 709.0	9.992	9.941	99.332	75
80	2 048.4	.00049	.00005	.1000	20 474.0	9.995	9.961	99.561	80
85	3 299.0	.00030	.00003	.1000	32 979.7	9.997	9.974	99.712	85
90	5 313.0	.00019	.00002	.1000	53 120.3	9.998	9.983	99.812	90
95	8 556.7	.00012	.00001	.1000	85 556.9	9.999	9.989	99.877	95
100	13 780.6	.00007	.00001	.1000	137 796.3	9.999	9.993	99.920	100

4% Compound Interest Factors 4%

n	Single Payment: Compound Amount Factor Find F Given P F/P	Single Payment: Present Worth Factor Find P Given F P/F	Uniform Payment Series: Sinking Fund Factor Find A Given F A/F	Uniform Payment Series: Capital Recovery Factor Find A Given P A/P	Uniform Payment Series: Compound Amount Factor Find F Given A F/A	Uniform Payment Series: Present Worth Factor Find P Given A P/A	Arithmetic Gradient: Gradient Uniform Series Find A Given G A/G	Arithmetic Gradient: Gradient Present Worth Find P Given G P/G	n
1	1.040	.9615	1.0000	1.0400	1.000	0.962	0	0	1
2	1.082	.9246	.4902	.5302	2.040	1.886	0.490	0.925	2
3	1.125	.8890	.3203	.3603	3.122	2.775	0.974	2.702	3
4	1.170	.8548	.2355	.2755	4.246	3.630	1.451	5.267	4
5	1.217	.8219	.1846	.2246	5.416	4.452	1.922	8.555	5
6	1.265	.7903	.1508	.1908	6.633	5.242	2.386	12.506	6
7	1.316	.7599	.1266	.1666	7.898	6.002	2.843	17.066	7
8	1.369	.7307	.1085	.1485	9.214	6.733	3.294	22.180	8
9	1.423	.7026	.0945	.1345	10.583	7.435	3.739	27.801	9
10	1.480	.6756	.0833	.1233	12.006	8.111	4.177	33.881	10
11	1.539	.6496	.0741	.1141	13.486	8.760	4.609	40.377	11
12	1.601	.6246	.0666	.1066	15.026	9.385	5.034	47.248	12
13	1.665	.6006	.0601	.1001	16.627	9.986	5.453	54.454	13
14	1.732	.5775	.0547	.0947	18.292	10.563	5.866	61.962	14
15	1.801	.5553	.0499	.0899	20.024	11.118	6.272	69.735	15
16	1.873	.5339	.0458	.0858	21.825	11.652	6.672	77.744	16
17	1.948	.5134	.0422	.0822	23.697	12.166	7.066	85.958	17
18	2.026	.4936	.0390	.0790	25.645	12.659	7.453	94.350	18
19	2.107	.4746	.0361	.0761	27.671	13.134	7.834	102.893	19
20	2.191	.4564	.0336	.0736	29.778	13.590	8.209	111.564	20
21	2.279	.4388	.0313	.0713	31.969	14.029	8.578	120.341	21
22	2.370	.4220	.0292	.0692	34.248	14.451	8.941	129.202	22
23	2.465	.4057	.0273	.0673	36.618	14.857	9.297	138.128	23
24	2.563	.3901	.0256	.0656	39.083	15.247	9.648	147.101	24
25	2.666	.3751	.0240	.0640	41.646	15.622	9.993	156.104	25
26	2.772	.3607	.0226	.0626	44.312	15.983	10.331	165.121	26
27	2.883	.3468	.0212	.0612	47.084	16.330	10.664	174.138	27
28	2.999	.3335	.0200	.0600	49.968	16.663	10.991	183.142	28
29	3.119	.3207	.0189	.0589	52.966	16.984	11.312	192.120	29
30	3.243	.3083	.0178	.0578	56.085	17.292	11.627	201.062	30
31	3.373	.2965	.0169	.0569	59.328	17.588	11.937	209.955	31
32	3.508	.2851	.0159	.0559	62.701	17.874	12.241	218.792	32
33	3.648	.2741	.0151	.0551	66.209	18.148	12.540	227.563	33
34	3.794	.2636	.0143	.0543	69.858	18.411	12.832	236.260	34
35	3.946	.2534	.0136	.0536	73.652	18.665	13.120	244.876	35
40	4.801	.2083	.0105	.0505	95.025	19.793	14.476	286.530	40
45	5.841	.1712	.00826	.0483	121.029	20.720	15.705	325.402	45
50	7.107	.1407	.00655	.0466	152.667	21.482	16.812	361.163	50
55	8.646	.1157	.00523	.0452	191.159	22.109	17.807	393.689	55
60	10.520	.0951	.00420	.0442	237.990	22.623	18.697	422.996	60
65	12.799	.0781	.00339	.0434	294.968	23.047	19.491	449.201	65
70	15.572	.0642	.00275	.0427	364.290	23.395	20.196	472.479	70
75	18.945	.0528	.00223	.0422	448.630	23.680	20.821	493.041	75
80	23.050	.0434	.00181	.0418	551.244	23.915	21.372	511.116	80
85	28.044	.0357	.00148	.0415	676.089	24.109	21.857	526.938	85
90	34.119	.0293	.00121	.0412	827.981	24.267	22.283	540.737	90
95	41.511	.0241	.00099	.0410	1012.8	24.398	22.655	552.730	95
100	50.505	.0198	.00081	.0408	1237.6	24.505	22.980	563.125	100

MANSOURA UNIVERSITY

Faculty of Engineering
BME, CCE, and MTE Programs

Course Title: **Principles of Marketing** **Final-Exam.: 2022**
Instructor : **Prof. Dr. Abd El-Aziz Ali Hassan**
Time: **2 Hours**
Student Name: ----------

Model 1

50 Questions MCQ & T/F (50Marks) ANSWER ALL

PART ONE: 25 MCQ

1) Which of the following is true with regard to products?
A) The quality of products is far more difficult to measure than that of services.
B) Products do not include experiences, organizations, persons, places, and ideas.
C) Products are not meant for sale in the market.
D) Products include services, events, persons, places, organizations, ideas, or a mixture of these.

2) _____ are a form of product that consists of activities, benefits, or satisfactions offered for sale that are essentially intangible and do not result in the ownership of anything.
A) Liabilities
B) Services
C) Brands
D) Consumer products

3) Which of the following exemplifies a service?
A) candy
B) laptop
C) retail
D) car

4) Marketing mix planning begins with _____.
A) building an offering that brings value to target customers
B) finding a suitable promotion strategy for the product
C) setting a reasonable price for the product
D) selecting the right channel for distribution of the product

5) Product planners need to consider products and services on three levels. Each level adds more customer value. The most basic level is the _____, which addresses the question, "What is the buyer really buying?"

A) an actual product
B) an augmented product
C) core customer value
D) co-branding

6) Consumer products refer to _____.
A) products purchased by consumers for further processing or for use in conducting a business
B) products and services bought by final consumers for personal consumption
C) primarily intangible offerings from marketers
D) raw materials as well as manufactured materials and parts

7) _____ are consumer products and services that customers usually buy frequently, immediately, and with minimal comparison and buying effort.
A) Unsought products
B) Capital items
C) Shopping products
D) Convenience products

8) _____ are less frequently purchased consumer products and services that customers compare carefully on suitability, quality, price, and style.
A) Shopping products
B) Convenience products
C) Unsought products
D) Capital items

9) _____ refers to the amount of money charged for a product or service.
A) Value
B) Cost
C) Price
D) Wage

10) _____ is the only element in the marketing mix that produces revenue.
A) Price
B) Product
C) Place
D) Fixed costs

11) Which of the following is true with regard to price?
A) Historically, price has had the least perceptible impact on buyer choice.
B) Price is the least flexible element in the marketing mix.
C) Unlike product features and channel commitments, prices cannot be changed quickly.
D) Price is the sum of all the values that customers give up to gain the benefits of having a product.

12) What sets the ceiling for product prices?

A) product manufacturing costs
B) sellers' perceptions of the product's value
C) customer perceptions of the product's value
D) variable costs

13) Effective _____ pricing involves understanding how much value consumers place on the benefits they receive from the product and setting a price that captures that value.
A) competition-oriented
B) cost-based
C) time-based
D) customer-oriented

14) _____ pricing uses buyers' perceptions of value as the key to pricing.
A) Customer value-based
B) Cost-based
C) Time-based
D) Markup

15) The sets of firms that supply companies with the raw materials, components, parts, information, finances, and expertise needed to create products or services are known as _____.
A) retailers
B) upstream partners
C) distributors
D) downstream partners

16) Which of the following terms refers to the wholesalers and retailers that form a vital link between the firm and its customers?
A) factory-supply networks
B) downstream partners
C) resource banks
D) upstream partners

17) A _____ is made up of the company, suppliers, distributors, and customers who partner to improve the performance of the entire system.
A) value delivery network
B) horizontal channel
C) consumer base
D) product delivery network

18) A _____ is a set of interdependent organizations that help make a product or service available for use or consumption by the consumer or business user.
A) product line
B) product delivery network
C) marketing channel
D) consumer base

19) HP's advertising agency assembles words and illustrations into an advertisement that conveys the company's intended brand message. In the context of the communication process, HP is _____.
A) messaging
B) decoding
C) sending
D) encoding

20) A(n) _____ is a set of symbols that the sender transmits.
A) encoder
B) feedback loop
C) message
D) media

21) Any paid form of nonpersonal presentation and promotion of ideas, goods, or services by an identified sponsor is called _____.
A) sales promotion
B) advertising
C) direct marketing
D) personal selling

22) The use of short-term incentives to encourage the purchase or sale of a product or service is called _____.
A) direct marketing
B) sales promotion
C) personal selling
D) public relations

23) Which of the following promotion tools involves building up a good corporate image and handling unfavorable stories and events?
A) sales promotion
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24) Which of the following promotion categories is most likely to include the use of displays, discounts, coupons, and demonstrations?
A) sales promotion
B) direct marketing
C) horizontal diversification
D) public relations

25) Extel Inc., a home appliance manufacturer, uses sales representatives to sell its products to wholesalers and individual customers. This is an example of _____.
A) sales promotion

B) personal selling
C) public relations
D) direct marketing

PART TWO: 25 TRUE OR FALSE Q. (A= True) (B=False)

26) A service refers to an activity, benefit, or satisfaction offered for sale that is essentially intangible and does not result in the ownership of anything. (T) (F)

27) Unsought products are products that the customer usually buys frequently, immediately, and with a minimum of comparison and buying effort. (T) (F)

28) Convenience products are less frequently purchased consumer products and services that customers compare carefully on suitability, quality, price, and style. (T) (F)

29) The augmented product is the actual product plus the various services and benefits offered with it, such as a warranty, free delivery, installation, and maintenance. (T) (F)

30) Style is a larger concept than design. Design simply describes the appearance of a product. (T) (F)

31) Branding decisions include determining a product price. (T) (F)

32) A product line consists of unrelated products that are sold to diverse customer groups. (T) (F)

33) Product mix consists of related products that are sold to diverse customer groups. (T) (F)

34) Value-based pricing uses the sellers' perception of value as the key to pricing. (T) (F)

35) Cost-based pricing is often customer driven. (T) (F)

36) Variable costs are costs that do not vary with production or sales level. (T) (F)

37) Cost-based pricing involves setting prices based on consumer perception of value. (T) (F)

38) The simplest pricing method is cost-plus pricing, which involves adding a standard markup to the cost of the product. (T) (F)

39) A break-even chart shows the total cost and total revenue expected at various sales volume levels. (T) (F)

40) Downstream marketing channel partners, such as wholesalers and retailers, form a vital link between the firm and its customers. (T) (F)

41) A company's channel decisions directly affect the prices of its products. (T) (F)

42) The role of marketing intermediaries is to transform the assortments of products made by retailers into the assortments wanted by producers. (T) (F)

43) In a direct marketing channel, the producer sells directly to the intermediaries, who in turn sell directly to the customers. (T) (F)

44) The communications process should start with mass media advertising in order to reach a large number of consumers. (T) (F)

45) The four major communication functions are only encoding, decoding, response, and noise. (T) (F)

46) Decoding is the process by which a sender puts his or her thoughts into a symbolic form. (T) (F)

47) Buzz marketing involves cultivating opinion leaders and getting them to spread information about a product or service to others in their communities. (T) (F)

48) In the communication process model, sender refers to what to say? (T) (F)

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Have a very good luck
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