

Mansoura  
University



Faculty of Pharmacy  
Department of  
Microbiology  
and Immunology



Biomedical Engineering Program  
General Microbiology and Immunology  
Exam (BME392)  
Level 300  
22<sup>nd</sup> of January 2019  
Time allowed: 2 hours



## تعليمات

على الطالب مراعاة الآتى:

- 1- الامتحان يتكون من 9 صفحات تشتمل على:
  - عدد 8 صفحات أسئلة مرقمة من 1 الى 8.
  - صفحة واحدة مسودة رقم 9.
- 2- يجب التأكد من عدد الصفحات قبل البدء فى الإجابة.
- 3- يجب الإجابة على كل سؤال فى الجزء المخصص له ولن يلتفت الى أى إجابات فى صفحة المسودة أو الأجزاء غير المخصصة له.
- 4- يجب الكتابة باللون الأزرق فقط وعدم استعمال أى أقلام ملونة أو كركتور.

خالص الأمنيات بالتوفيق

د. محمد أسعد المواقى



**ANSWER THE FOLLOWING QUESTIONS:**

**Mark:**

❖ **Question I: (20 Marks)**

Complete the missing part (المستطيل الأبيض) in the following tables:

➤ **Table A: (5 Marks)**

**Student Mark:**

Item of comparison:	Prokaryotic cell	Eukaryotic cell
1- Nucleus:		
2- Mitochondria:		
3- DNA:		
4- Example:		

➤ **Table B: (5 Marks)**

**Student Mark:**

Item of comparison:	Gram positive bacteria	Gram negative bacteria
1- Lipid content of cell wall:		
2- Outer membrane:		
3- Peptidoglycan layer:		
4- Example:		

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➤ Table C: (5 Marks)

Student Mark:

Number of cycles in PCR:		
PCR step:	Temperature (°C):	Time:
• Denaturation:		
• Annealing:		
• Extension:		

➤ Table D: (5 Marks)

Student Mark:

Antibody:	Role:
IgA:	
IgD:	
IgM:	
IgE:	
IgG:	

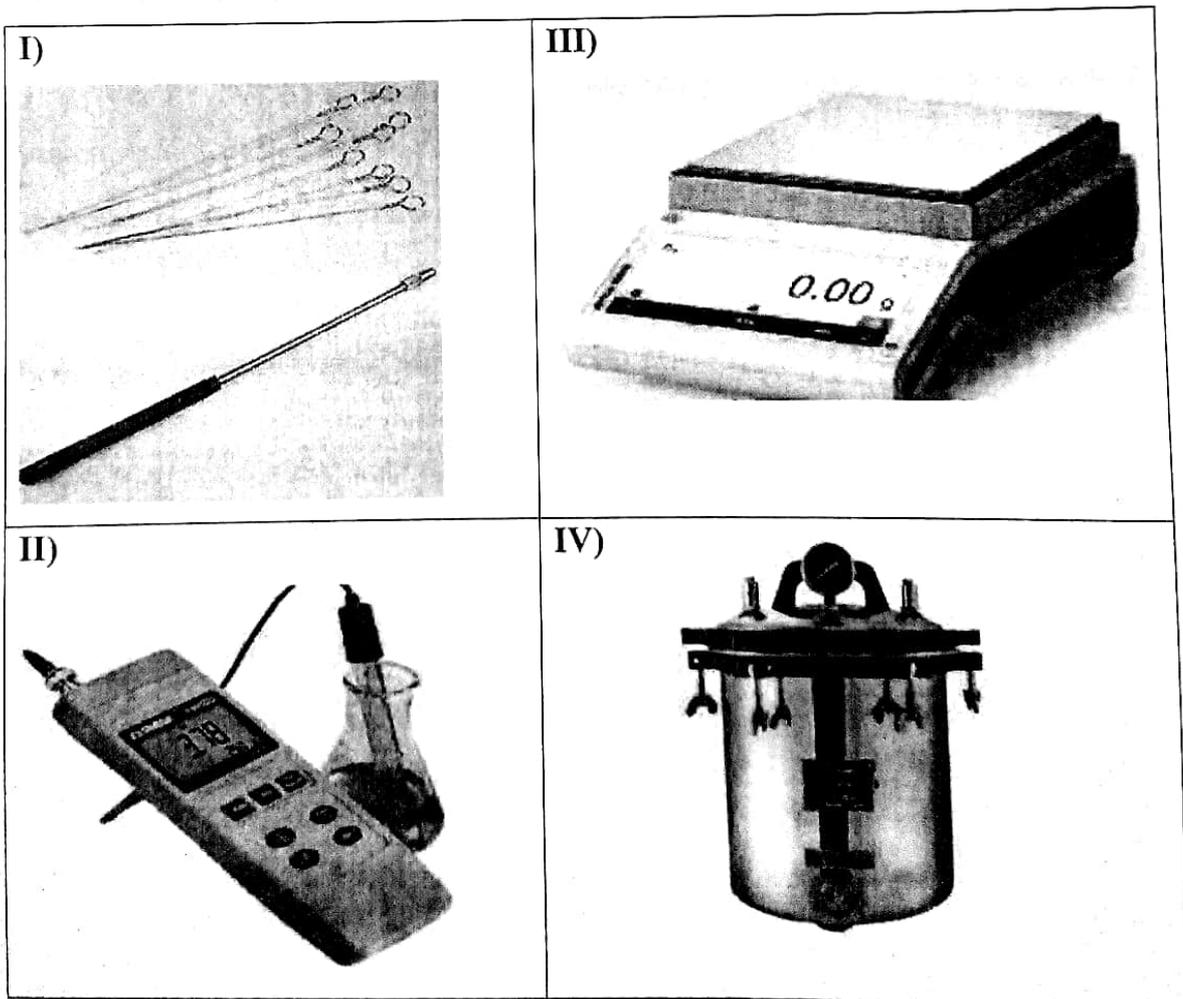
❖ Question II: (4 Marks)Mark:  
.....

These are different unarranged steps of cultivation of bacteria and different devices or tools that may be used in these steps in a Microbiology lab.

## ➤ Unarranged steps:

- Adjustment of pH of the medium.
- Transfer of bacteria to the medium.
- Sterilization of the medium.
- Incubation of the cultivated microorganism.
- Preparation of the medium in the suitable container.

## ➤ Devices and tools:





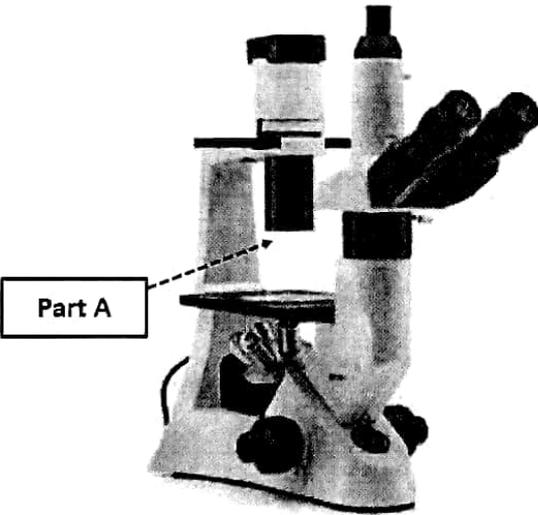
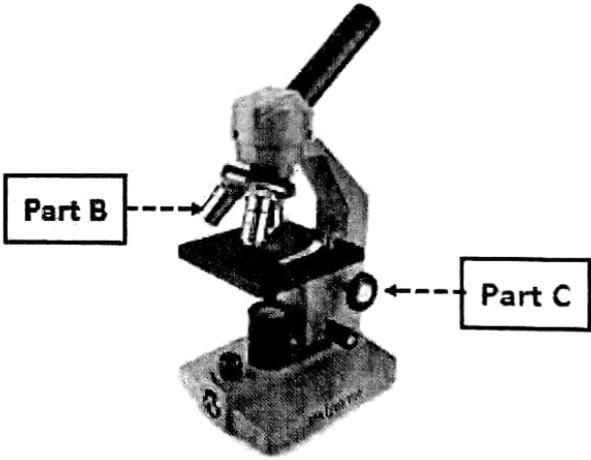
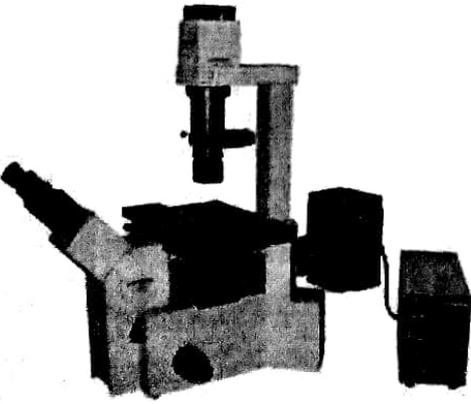
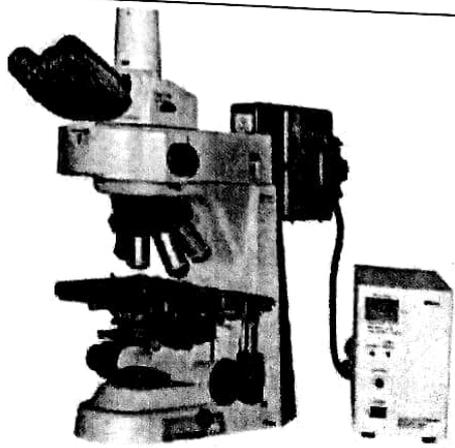
➤ Answer the following questions: (4 Marks/ One Mark each)

- The device number III can weigh the following: (Choose one correct answer)
  - a) 3 mg      b) 43 mg   c) 1.05 mg   d) 1.666 gram   e) 1.11 gram
- Step number 3 is..... and the device or tool used in it is number .....
- Step number 5 is .....

❖ **Question III: (6 Marks/ One Mark each)**

<b>Mark:</b>
.....

Answer the following statements regarding microscopes using the figures provided below:

<p>I)</p>  <p>Part A</p>	<p>III)</p>  <p>Part B      Part C</p>
<p>II)</p> 	<p>IV)</p> 



1) Part A in microscope number I is:

- a) Illuminating source    b) Camera    c) Ocular lens    d) Objective lens

2) Part B in microscope number III is:

- a) Illuminating source    b) Camera    c) Ocular lens    d) Objective lens

3) Part C in microscope number III is important to:

- a) Move the stage of microscope large vertical movement.  
b) Move the stage of microscope small vertical movement  
c) Control the amount of light  
d) Increase the contrast of the image

4) An example of inverted microscope is microscope number.....

5) An example of Bright field microscope is microscope number.....

6) An example of inverted fluorescence microscope is microscope number.....

❖ **Question IV: (20 Marks)**

**Mark:**

Choose the correct answer for the following statements and transfer its letter to the table below: (20 Marks/1 Mark each)

ولن يلتفت الى اى اجابات خاصة بهذا السؤال الا فقط الموجودة فى المكان المخصص لها بالجدول التالى:

Question number	Answer						
1		6		11		16	
2		7		12		17	
3		8		13		18	
4		9		14		19	
5		10		15		20	



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1- In ..... phase of the growth curve, the number of cells remains constant:

a) Stationary	b) lag
c) Decline	d) Log

2- The activities of immune system include:

a) Body defense against infection	b) Absorption of food.
c) Growth of human body	d) All the above

3- The 2nd line of defense includes:

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

4- According to the confirmed search of your colleague Biomedical Engineer: Ahmed Rizk Mesbah, Mercury lamp is usually used as a light source for fluorescent microscope because:

a) The major intensity of the wavelength in the emission spectrum is that of blue light.
b) Mercury lamp is a cheap light source.
c) Mercury lamp gives strong illumination.
d) Mercury lamp has long half-life.

5- Hepatitis C virus (HCV) attacks liver specifically because:

a) HCV multiply only in liver.	b) HCV polymerase is active only in liver cells	c) Immune system is inactive in liver
d) Liver cells contain specific receptors on its surface that bind with HCV.		

6- Fungi is important in production of:

a) Milk	b) Antibodies
c) Bread	d) Wood

7- The following shape of fungi "  " is called:

a) Yeast	b) Hypha	c) mycelium	d) Cocci
----------	----------	-------------	----------



8- *Candida albicans* is usually examined by:

- |                              |                        |
|------------------------------|------------------------|
| a) 10x or 40x objective lens | b) Electron microscope |
| c) 100x oil immersion lens   | d) 120x objective lens |

9- Viruses have the following character:

- |                                  |   |
|----------------------------------|---|
| a) Bigger size than bacteria     | b) Can synthesize Protein               |
| c) Can generate their own energy | d) Consists of protein and nucleic acid |

10- Viruses can be cultivated using:

- |                                    |                                    |
|------------------------------------|------------------------------------|
| a) Cell (Tissue) culture technique | b) Media for bacteria              |
| c) Media for viruses               | d) Special media for microorganism |

11- Viruses are mainly classified according to their:

- |                 |            |                      |           |
|-----------------|------------|----------------------|-----------|
| a) Nucleic acid | b) Envelop | c) Cell wall content | d) Capsid |
|-----------------|------------|----------------------|-----------|

12- The following is used for determination of progress of treatment of HCV infection:

- |                      |                          |
|----------------------|--------------------------|
| a) Thermocycler only | b) Media                 |
| c) Microscope        | d) Real time PCR machine |

13- The main enzyme used in PCR reaction is:

- |                         |                         |
|-------------------------|-------------------------|
| a) Viral RNA polymerase | b) Viral DNA polymerase |
| c) Taq RNA polymerase   | d) Taq DNA polymerase   |

14- The ability of a thermocycler to selectively amplify a particular sequence of DNA is due to the presence of .....in the PCR reaction:

- |          |           |                   |            |
|----------|-----------|-------------------|------------|
| a) dNTPs | b) Buffer | c) DNA polymerase | d) Primers |
|----------|-----------|-------------------|------------|

15- The following is true regarding inverted microscope:

- |  |                                   |
|--|-----------------------------------|
| a) Used in routine examination of parasites.                                 | b) Used in cell culture technique |
| c) The magnification power of objective lens could be 5x, 10x, 40x, or 100x. | d) All the above                  |



16- Cedar oil is added on slide when using oil immersion lens to:

- |   |   |
|---|---|
| a) Increase the contrast                        | b) Avoid diffraction (انحراف) of light        |
| c) Increase the magnification power of the lens | d) Protect the microscope user from infection |

17- GFP is a.....:

- |  |  |
|--|--|
| a) Fluorescent dye that gives green fluorescence   | b) Fluorescent protein that gives green fluorescence   |
| c) Fluorescent dye that is excited by green light. | d) Fluorescent protein that is excited by green light. |

18- .....microscope is suitable for observing internal details and locomotion structures on cells:

- |                   |               |
|-------------------|---------------|
| a) Bright field   | b) Dark field |
| c) Phase contrast | d) Inverted   |

19- A fluorescent dye bound to antibody was used in the diagnosis of infection with certain virus, the following is true regarding the analysis of infection:

- a) Qualitative analysis of infection can be made by detection of fluorescence using bright field microscope.
- b) Quantitative analysis of infection can be made by detection of fluorescence using fluorometer.
- c) Quantitative analysis of infection can be made by detection of fluorescence using fluorescent microscope.
- d) The greater the detected fluorescence the lower the infection.

20- Carrier proteins in the cell membrane is important in the following cellular transport:

- |                     |                          |
|---------------------|--------------------------|
| a) Simple diffusion | b) Facilitated diffusion |
| c) Osmosis          | d) Endocytosis           |

**Good Luck**

**Dr. Mohammed Asaad Elmowafy**

**ANSWER THE FOLLOWING QUESTIONS:**

**Mark:**

❖ **Question I: (20 Marks)**

Complete the missing part (المستطيل الأبيض) in the following tables:

➤ **Table A: (5 Marks)**

**Student Mark:**

Item of comparison:	Prokaryotic cell	Eukaryotic cell
1- Nucleus:	Absent	
2- Mitochondria:		present
3- DNA:	Single	
4- Example:	Bacteria	Human, plant, fungi

➤ **Table B: (5 Marks)**

**Student Mark:**

Item of comparison:	Gram positive bacteria	Gram negative bacteria
1- Lipid content of cell wall:	Absent	
2- Outer membrane:		Present
3- Peptidoglycan layer:	Thick	
4- Example:	Staphylococcus aureus	Escherichia coli

محمد تيسر كوازي

➤ **Table C: (5 Marks)**

**Student Mark:**

<b>Number of cycles in PCR:</b>	25-40	
<b>PCR step:</b>	<b>Temperature (°C):</b>	<b>Time:</b>
• <b>Denaturation:</b>	95	
• <b>Annealing:</b>	55-65	45 sec
• <b>Extension:</b>	72	

➤ **Table D: (5 Marks)**

**Student Mark:**

<b>Immunoglobulin:</b>	<b>Role:</b>
<b>IgA:</b>	Found in exocrine secretions (e.g., breast milk (لبن السرسوب), saliva, tears).
<b>IgD:</b>	Still unknown.
<b>IgM:</b>	Produced in early or acute infection. (مؤشر على إصابة حديثة بميكروب معين)
<b>IgE:</b>	In allergic reactions e.g. eczema In parasitic infections (الديدان و الطفيليات)
<b>IgG:</b>	For diagnosis of chronic infection. (مؤشر على إصابة قديمة أو مزمنة بميكروب معين)

3/2/2020

❖ **Question II: (4 Marks)**

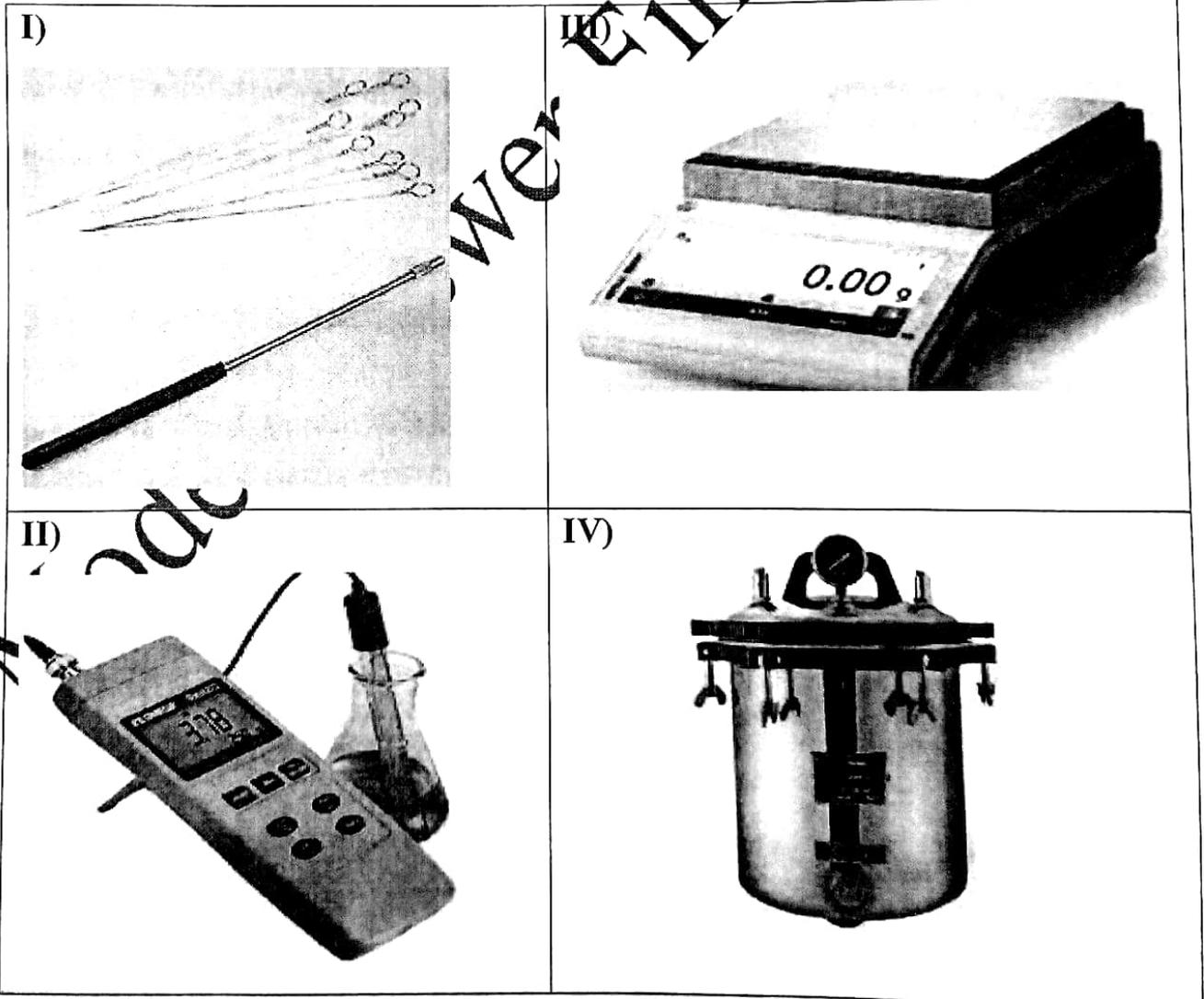
**Mark:**

These are different unarranged steps of cultivation of bacteria and different devices or tools that may be used in these steps in a Microbiology lab.

➤ **Unarranged steps:**

- a) Adjustment of pH of the medium.
- b) Transfer of bacteria to the medium.
- c) Sterilization of the medium.
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- e) Preparation of the medium in the suitable container.

➤ **Devices and tools:**



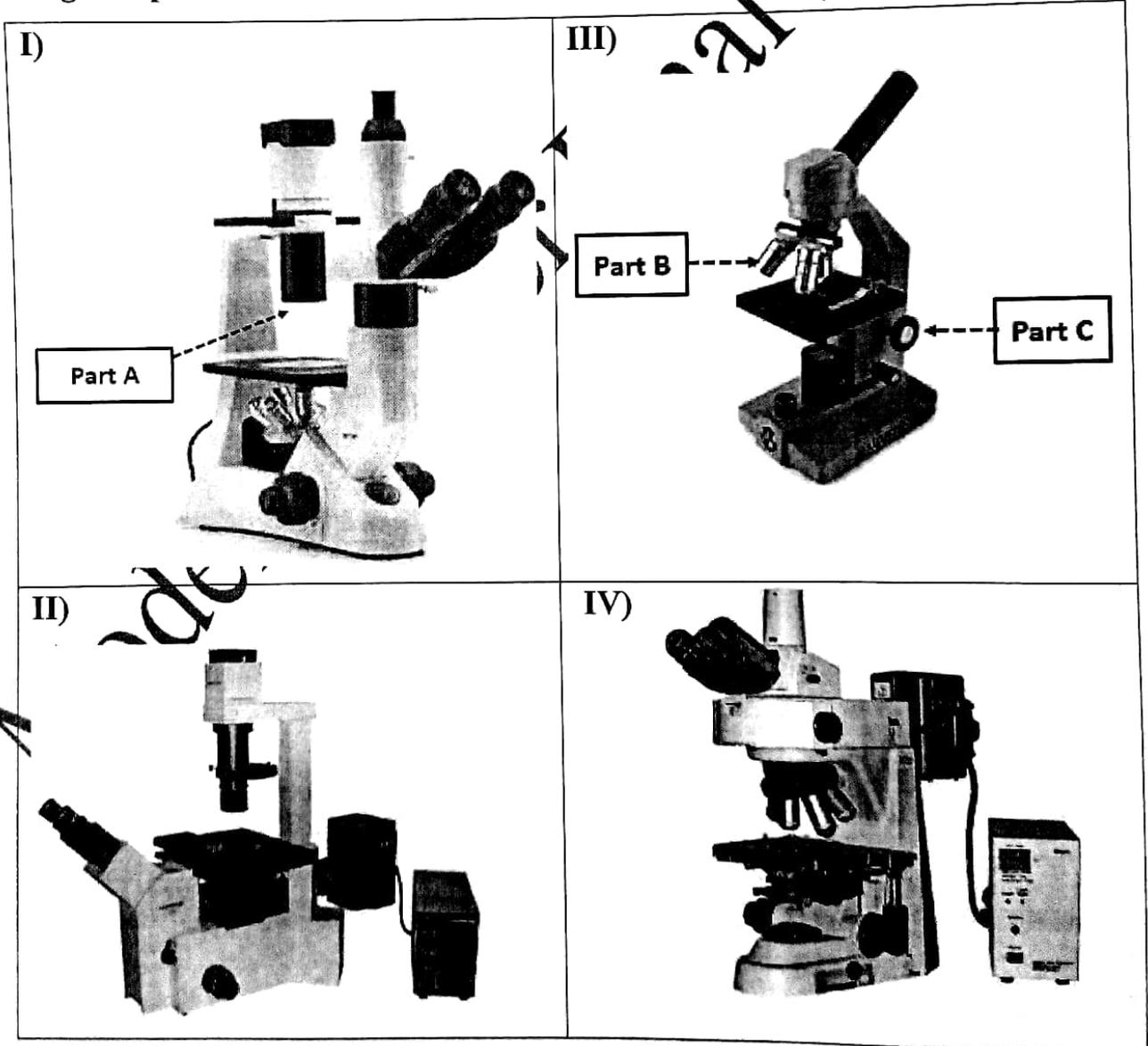
➤ **Answer the following questions: (4 Marks/ One Mark each)**

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- Step number 3 is C and the device or tool used in it is number IV
- Step number 5 is D

❖ **Question III: (6 Marks/ One Mark each)**

Answer the following statements regarding microscopes using the figures provided below:

**Mark:**  
.....



*Handwritten signature or mark*

1) Part A in microscope number I is:

- a) Illuminating source    b) Camera    c) Ocular lens    d) Objective lens

2) Part B in microscope number III is:

- a) Illuminating source    b) Camera    c) Ocular lens    d) Objective lens

3) Part C in microscope number III is important to:

- a) Move the stage of microscope large vertical movement.  
b) Move the stage of microscope small vertical movement  
c) Control the amount of light  
d) Increase the contrast of the image  
4) An example of inverted microscope is microscope number I or II  
5) An example of Bright field microscope is microscope number III  
6) An example of inverted fluorescence microscope is microscope number II

❖ Question IV: (20 Marks)

Mark:

Choose the correct answer for the following statements and transfer its letter to the table below: (20 Marks/1 Mark each)

ولن يلتفت الى اي اجابات خاصة بهذا السؤال الا فقط الموجودة في المكان المخصص لها بالجدول التالي:

Question number	Answer						
1	a	6	C	11	a	16	b
2	a	7	a	12	d	17	b
3	d	8	a	13	d	18	c
4	a	9	d	14	d	19	b
5	d	10	a	15	b	20	b