

Question Booklet Series: **A**

Question Booklet Serial No. **110033**

## CET (PG) – 2018

**Important:** Please consult your Admit Card/Roll No. slip before filling your Roll Number on the Test Booklet and Answer Sheet.

Roll No.

*In Figure*

*In Words*

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O.M.R. Answer Sheet Serial No.

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Signature of Candidate: \_\_\_\_\_

Signature of Invigilator: \_\_\_\_\_

**Subject: M.E. (Bio-Technology)**

Time: 90 Minutes

Number of Questions: 75

Maximum Marks: 75

**DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO.**

### **INSTRUCTIONS:**

1. Write your Roll No. on the Questions Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Question Booklet Serial No. on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point/Black Gel Pen**.
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. Please check that this Question Booklet contains 75 Questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of Test.
5. Each question has four alternative answer (A,B,C,D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point/Black Gel Pen**. **There shall be negative marking for wrong answer, ¼ of the marks of the question will be deducted for every wrong answer.**
6. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Booklet. No marks will be deducted in such cases.
7. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the question given in the Question Booklet.
8. If you want to change an already marked answer, erase the shade in the darkened bubble completely.
9. For rough work only the blank sheet at the end of the Question Booklet be used.
10. The University will provide Logarithmic table. Borrowing of log table or other material is not allowed.
11. The Answer Sheet is designed for computer evaluation. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e. not following the instructions completely, shall be of the candidate only.**
12. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
13. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so would be expelled from the examination.
14. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistant or found giving or receiving assistant or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
15. **Communication equipment such as mobile phones, pager, wireless set, scanner, camera or any electronic/digital gadget etc., is not permitted inside the examination hall. Use of calculators is not allowed.**
16. The candidates will not be allowed to leave the Examination Hall/Room before the expiry of the allotted time.

- Heat inactivation of serum is done to inactivate
  - pathogenic bacteria
  - mycoplasma
  - complement
  - prions
- Agarose extracted from sea weeds finds use in
  - gel electrophoresis
  - spectroscopy
  - polymerase chain reaction
  - tissue culture
- The techniques of obtaining large number of plantlet by tissue culture method is called
  - macropropagation
  - organ culture
  - micropropagation
  - plantlet culture
- Alec Jeffery's name is associated with
  - DNA sequencing
  - RNA sequencing
  - DNA finger printing
  - site directed mutagenesis
- Molecular scissors are
  - ligase
  - restriction endonuclease
  - helicase
  - DNA polymerase
- A batch bioreactor is to be scaled up from 10 to 10,000 liters. The diameter of the large bioreactor is 10 times that of the small bioreactor. The agitator speed in the small bioreactor is 450 rpm. Determine the agitator speed (rpm) of the large bioreactor with same impeller tip speed as that of the small bioreactor. \_\_\_\_\_
  - 0.45
  - 4.5
  - 45
  - 450
- Electroporation facilitates introduction of foreign DNA into the target organism by
  - lysis of the cell wall
  - changing the porosity of the cell wall
  - changing the electric potential of the cell wall
  - active transport across the cell wall
- Which of the following contains four pyrimidine bases?
  - GATCAATGC
  - UAGCGGUAA
  - GCUAGACAA
  - TGCCTAACG
- The genetically modified brinjal in India has been developed for
  - enhancing mineral content
  - drought resistance
  - enhancing shelf life
  - insect resistance
- Dimethyl sulfoxide is used as
  - chelating agent

- B. gelling agent  
 C. alkylating agent  
 D. cryoprotectant
11. The Pascal unit of pressure can be written as  
 A.  $\text{kg m}^{-1}\text{s}^{-2}$   
 B.  $\text{kg m}^2\text{s}^{-1}$   
 C.  $\text{kg m}^{-1}\text{s}^{-1}$   
 D.  $\text{kg m s}^{-2}$
12. Callus is  
 A. tissue that forms embryo  
 B. an insoluble carbohydrate  
 C. tissue that grows to form embryo  
 D. a growing mass of unorganized plant parenchyma cells
13. Two amino acids having R group with a net negative net charge at pH 7 are  
 A. arginine and histidine  
 B. cysteine and methionine  
 C. proline and valine  
 D. aspartate and glutamate
14. Which one of the following does NOT belong to the phylum of bacteria  
 A. actinobacteria  
 B. thermotogae  
 C. proteobacteria  
 D. methanobacterium
15. If  $\text{pK}_1 = 2.54$  and  $\text{pK}_2 = 9.12$ , then the isoelectric point is  
 A. 5.87  
 B. 5.83  
 C. 6.58  
 D. 11.66
16. Which among the following is a non-essential amino acid?  
 A. tyrosine  
 B. lysine  
 C. histidine  
 D. threonine
17. Which of the following is the correct line weaver-Burk equation  
 A.  $V_o = \frac{V_{max}[S]}{K_m + [S]}$   
 B.  $\frac{1}{V_o} = \frac{K_m}{V_{max}[S]} + \frac{1}{V_{max}}$   
 C.  $\frac{1}{V_{max}} = \frac{K_m}{V_o[S]} + \frac{1}{V_o}$   
 D.  $V_{max} = \frac{V_o[S]}{K_m + [S]}$
18. If enthalpy change of a reaction is zero then  $\Delta G^\circ$  is equal to  
 A.  $-T\Delta S^\circ$   
 B.  $-\Delta H^\circ$   
 C.  $T\Delta S^\circ$   
 D.  $\ln K_{eq}$
19. The molar absorption coefficient of tyrosine in water is  $1280 \text{ M}^{-1}\text{cm}^{-1}$  at 280 nm. Calculate the concentration of a tyrosine solution in water if the absorbance of the solution is 0.448 in a 1 cm path length cell.  
 A.  $573 \mu\text{M}$   
 B.  $285 \mu\text{M}$

- C. 350  $\mu\text{M}$   
D. 125  $\mu\text{M}$
20. Which one of the following is NOT a dimension
- Length
  - Mass
  - Kelvin
  - Time
21. An ultracentrifuge is operated at a speed of 20000 rpm for the pelleting of the microsomal fraction from a linear homogenate. What is the angular velocity in radians per second?
- 2094.4
  - 2904.4
  - 4088.4
  - 4288.4
22. Standard pressure and temperature refer to
- 0 atm and 273 K
  - 1 atm and 273 K
  - 101.325 kPa and 0 K
  - 23 psi and 100 K
23. How many atoms of carbon are present in 18 grams of glucose?
- $6.02 \times 10^{23}$
  - $3.6 \times 10^{23}$
  - $6.02 \times 10^{24}$
  - $3.6 \times 10^{24}$
24. In bioinformatics, full form of BLAST is
- broad local alignment search tool
  - basic local alignment search tool
  - basic local alignment scanning tool
  - broad local alignment scanning tool
25. DNA is composed of repeating units of
- Ribonucleosides
  - Ribonucleotides
  - Deoxyribonucleosides
  - Deoxyribonucleotides
26. Double helical structure of DNA was proposed by
- Kornberg
  - Watson and Crick
  - Nirenberg
  - Wilkins and Franklins
27. In transmission electron microscopy, electron opacity can be enhanced by treating the specimen with
- ferrous ammonium sulphate
  - sodium chloride
  - uranium acetate
  - magnesium chloride
28. Each enzyme can speed up only one particular reaction. This specificity is due to the
- lowering of activation energy
  - shape of both the enzyme and the substrate
  - pH of the surrounding medium
  - temperature of the surrounding medium

29. What do you mean by "Axenic culture"?
- containing single type of organism
  - containing two types of organism
  - containing multiple types of organism
  - not containing any type of organism
30. The theoretical COD (chemical oxygen demand) of a 150 ppm glucose solution is \_\_\_\_\_
- 80 mg/L
  - 27 mg/L
  - 120 mg/L
  - 160 mg/L
31. If a cell has solute concentration of 0.05%, which of the following solution would be hypotonic to it?
- 0.01% solute
  - 0.1% solute
  - 0.5% solute
  - 5% solute
32. With reference to Chromatography, what does the retention factor,  $k'$ , describe?
- the velocity from the stationary phase
  - the velocity of the mobile phase
  - the distribution of an analyte between the stationary and the mobile phase
  - the migration rate of an analyte through a column
33. A polymerase chain reaction was performed beginning with 200 template DNA molecules in a 100  $\mu$ L reaction. How many molecules of amplicons will be generated?
- $1.024 \times 10^4$
  - $1.024 \times 10^5$
  - $2.048 \times 10^4$
  - $2.048 \times 10^5$
34. A protein is phosphorylated at a serine residue. A phosphomimic mutant of the protein can be generated by substituting that serine with
- glycine
  - alanine
  - aspartate
  - threonine
35. Molecular chaperones are class of proteins that facilitate
- degradation of newly synthesized proteins
  - the proper folding of newly synthesized proteins
  - targeting of newly synthesized proteins
  - unfolding of newly synthesized proteins
36. A chemostat is operated at a dilution rate of  $0.6 \text{ h}^{-1}$ . The biomass concentration in the exit stream at steady state was found to be  $30 \text{ gL}^{-1}$ . The biomass productivity ( $\text{gL}^{-1}\text{h}^{-1}$ ) after 3h of steady state operation will be \_\_\_\_\_
- 6
  - 18
  - 54
  - 150
37. A cell in G1 of interphase has 12 chromosomes. How many chromosomes will be found per cell during prophase II of meiosis?
- 24
  - 18
  - 12

38. Restriction endonucleases that recognize and cut same recognition sequences are known as
- abzymes
  - isoaccepting endonucleases
  - isoschizomers
  - isozymes
39. What type of cells are surrounded by calcified bone and secrete the bone matrix?
- osteoclast
  - osteoid
  - osteoblast
  - osteocyte
40. The rate constant of a chemical reaction decreases by decreasing the
- pressure
  - temperature
  - duration of reaction
  - concentration of reactants
41. In gas chromatography, the basis for separation of the components is the difference in
- partition coefficients
  - conductivity
  - molecular weight
  - molarity
42. Which organic solvent is used for yeast cell lysis
- acetonitrile
  - carbinol
  - dichloromethane
  - toluene
43. How many moles of  $H_2O$  are produced when 10 moles of  $O_2$  are added to 10 moles of  $H_2$ ?
- 5
  - 10
  - 15
  - 20
44. Endothermic reactions are driven by
- Decrease in the entropy of the system
  - Increase in the entropy of the system
  - Increase in Gibbs energy of the system
  - Increase in internal energy of the system
45. What is the mass of a liquid having density  $20 \text{ kgm}^{-3}$ , enclosed in a sphere of radius 1 m?
- 80.7 kg
  - 83.7 kg
  - 85.7 kg
  - 88.7 kg
46. Competence is determined by the excretion into growth medium of \_\_\_\_\_, \_\_\_\_\_ proteins called as competence proteins.
- cellular, high molecular weight
  - cellular, low molecular weight
  - extracellular, low molecular weight
  - extracellular, high molecular weight

47. The major factor(s) determining whether glucose is oxidized by aerobic or anaerobic glycolysis is/are
- $\text{Ca}^{+2}$
  - $\text{FADH}_2$
  - NADH and ATP/ADP ratio
  - presence of high AMP
48. Which of the following condition represents reverse phase chromatography?
- the mobile phase is polar and stationary phase is non-polar
  - the mobile phase is non-polar and stationary phase is polar
  - both the mobile phase and stationary phase are organic
  - both the mobile phase and stationary phase are inorganic
49. Which of the following techniques does not require the measurement of dissolved oxygen concentrations in a fermenter?
- dynamic gassing out method
  - static gassing out method
  - oxygen-Balance method
  - sulphite oxidation method
50. The charge present on the DNA backbone is negative. The force required to accelerate the molecules towards anode is directly proportional to number of
- sugar molecules
  - nitrogenous bases
  - phosphate groups
  - both phosphate group and sugar molecules
51. Adenosine triphosphate is NOT used for which of the following processes?
- diffusion of oxygen into cells
  - synthesis of molecules
  - muscle contraction
  - conduction of nerve impulses
52. If the mole fraction of 4.5 moles of solute is 0.5, what is the number of moles of solvent?
- 9
  - 4.5
  - 1.5
  - 3
53. A first order reaction requires two equal sized CSTR. The conversion is
- more when they are connected in series
  - more when they are connected in parallel
  - same whether they are connected in series or parallel
  - less when they are connected in series
54. Which of the following separation method is most suitable for a protein sample with large differences in molecular mass
- Rate zonal centrifugation
  - Dialysis
  - Density gradient centrifugation
  - Salting out process
55. How many primers are used in the process of reverse transcriptase amplification?
- 1
  - 2
  - 3
  - 4
56. Match the downstream processes in **GROUP I** with the products in **GROUP II**

**GROUP I**

- P. Solvent extraction
- Q. Protein-A linked affinity chromatography
- R. Extractive distillation
- S. Salting out

**GROUP II**

- 1. Lactic acid
- 2. Penicillin
- 3. Monoclonal antibody
- 4. Lipase

- A. P-2,Q-3,R-1, S-4
- B. P-4,Q-1,R-2, S-3
- C. P-4,Q-1,R-3, S-2
- D. P-2,Q-4,R-1, S-3

57. Which of the following statements about chromatography is correct?
- A. Paper chromatography and gas chromatography are both routinely used for qualitative analysis only.
  - B. Paper chromatography is usually considered to be quantitative only, while gas chromatography can be qualitative or quantitative.
  - C. Paper chromatography is usually considered to be qualitative only, while gas chromatography can be qualitative or quantitative.
  - D. Paper chromatography and gas chromatography are both routinely used for quantitative analysis only.
58. Mycobacterium tuberculosis is an intra cellular bacterium. It prefers to infect
- A. macrophages
  - B. B-cells
  - C. T-cells
  - D. neutrophils
59. In fractional distillation, a mixture of liquids is separated based on their
- A. solubility
  - B. density
  - C. boiling point
  - D. chemical composition
60. What is the effect of sudden increase in the levels of ATP and citrate on an erythrocyte undergoing glycolysis?
- A. It inhibits glycolysis.
  - B. It simulates glycolysis
  - C. The rate of glycolysis remains unaltered
  - D. The rate of glycolysis increases gradually
61. During eukaryotic cell division, metaphase to anaphase transition is regulated by degradation of
- A. Cyclin B1
  - B. CDK1
  - C. Aurora A kinase
  - D. Polo-like kinase
62. A dye used in gram staining is
- A. Methylene Blue
  - B. Rhodamine
  - C. Crystal Violet
  - D. Giemsa
63. If both the solute and the solvent obey Raoult's law, the solution is
- A. an ideal dilute solution
  - B. an ideal solution
  - C. a non-ideal solution



- D. a regular solution
64. Reverse transcriptase enzyme is isolated from which organism?
- Bacteria
  - Fungi
  - Prions
  - Virus
65. The internal energy of a gas increases by 1J when it is compressed by a force of 1 Newton through 2 m. The heat change of the system is \_\_\_\_\_
- 1 J
  - 1 J
  - 2 J
  - 2 J
66. The ionic strength of a 0.2 M  $\text{Na}_2\text{HPO}_4$  solution will be
- 0.2 M
  - 0.4 M
  - 0.6 M
  - 0.8 M
67. In the following equations, exponential population growth is described by
- $\frac{dN}{dt} = rN$
  - $Nt = N_0 e^{rt}$
  - $\frac{dN}{dt} = rN \left( \frac{K-N}{K} \right)$
  - $\frac{dN}{dT} = rN \left( \frac{N}{K} \right)$
- P and Q
  - P only
  - R only
  - Q and S
68. Starvation proteins are produced by a culture during which of the following segments of growth curve?
- Lag phase
  - Log phase
  - Stationary phase
  - Death phase
69. The correct form of a simple Langmuir isotherm is
- $\theta = Kp$
  - $\theta = Kp^{1/2}$
  - $\theta = \frac{1+Kp}{Kp}$
  - $\theta = \frac{Kp}{(1+Kp)}$
70. For every 10 degree rise in temperature the rate of a chemical reaction doubles. If the temperature is increased from 30 degree to 70 degree, the rate of reaction increases \_\_\_\_\_ times.
- 8
  - 12
  - 16
  - 40
71. Which of the following biosensors use the movement of electrons produced during redox reaction?
- amperometric biosensor

- B. potentiometric biosensor
  - C. piezo-electric biosensor
  - D. optical biosensor
72. A reactor is generally termed as an autoclave, when it is a
- A. atmospheric pressure CSTR
  - B. low pressure tubular reactor
  - C. atmospheric pressure tank reactor
  - D. high pressure batch reactor
73. Space velocity is a measure of the performance of flow reactors. The space velocity has the units of
- A. time
  - B.  $\text{time}^{-1}$
  - C. velocity
  - D.  $\text{velocity}^{-1}$
74. Steel consists of mainly iron and carbon. Under which of the following categories does it belong?
- A. polymer
  - B. composites
  - C. ceramics
  - D. metallic solids
75. Which of the following statements is FALSE?
- A. The repeat unit in natural rubber is isoprene
  - B. Both starch and cellulose are polymers of glucose
  - C. Artificial silk is derived from cellulose
  - D. Nylon-66 is an example of elastomer

x-x-x