

**B****DF-1672****Second Year B. Sc. (Biotechnology)****(Sem. III) (CBCS) Examination****March / April - 2016****Core - I Course - I : Instrumentation & Techniques - I  
(New Course)**

Time : 2 Hours]

[Total Marks : 50

**Instructions :**

(1)

નીચે દર્શાવેલ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
<input type="text" value="Second Year B. Sc. (Biotechnology) (Sem. III) (CBCS)"/>	<input type="text" value="Student's Signature"/>
Name of the Subject :	
<input type="text" value="Core - I Course - I : Instru. &amp; Techniques - I (New)"/>	
Subject Code No. : <input type="text" value="1"/> <input type="text" value="6"/> <input type="text" value="7"/> <input type="text" value="2"/>	Section No. (1, 2,.....): <input type="text" value="NIL"/>

- (2) This exam contains 50 multiple choice questions, each worth I mark.
- (3) Choose only ONE most appropriate answer per question.
- (4) Do not crease or fold the answer sheet.

***O.M.R. Sheet ભરવા અંગેની અગત્યની સૂચનાઓ આપેલ  
O.M.R. Sheet-ની પાછળ છાપેલ છે.  
Important instructions to fillup O.M.R. Sheet  
is given on back side of the provided O.M.R. Sheet.***

- 1 Why is it generally preferable to use absorbance as a measure of absorption rather than % transmittance ?
  - (A) None
  - (B) Because %T cannot be measured as accurately as absorbance
  - (C) Because %T is dependent on the power of the incident radiation
  - (D) Because absorbance is proportional to the concentration of the analyte, whereas %T is not
- 2 Cuvettes are made from \_\_\_\_\_ glass.
  - (A) Toughened glass
  - (B) Simple glass
  - (C) Borosilicate glass
  - (D) Safety glass
- 3 The effect of interference of CO<sub>2</sub> and H<sub>2</sub>O on absorbance can be removed much more by using \_\_\_\_\_.
  - (A) Conductometer
  - (B) Double beam spectrophotometer
  - (C) Colorimeter
  - (D) Single beam spectrophotometer
- 4 Which of the following are the characteristics of fluorescence ?
  - (A) All
  - (B) Fluorescence is instantaneous
  - (C) Emission occurs within a nanosecond
  - (D) Fluorescence depends upon nature of solvent
- 5 Re-emission of excess radiation in fluorescence takes place within \_\_\_\_\_.
  - (A) 1 to 2 minutes
  - (B) 10<sup>-4</sup> to 10<sup>-8</sup> second of absorption
  - (C) 10<sup>-8</sup> to 10<sup>-4</sup> second absorption
  - (D) 10<sup>-4</sup> to 20 seconds of absorption
- 6 Identify correct statement from following :
  - (A) Fluorescence is delayed luminescence
  - (B) The life time of phosphorescence is much longer than fluorescence
  - (C) The life time of phosphorescence is much shorter than fluorescence
  - (D) The excited states are stable
- 7 In triplet state of excitation spin of electrons \_\_\_\_\_.
  - (A) Paired
  - (B) Parallel
  - (C) Opposite
  - (D) Cannot be said
- 8 What will be the net spin in singlet excited state ?
  - (A) Zero
  - (B) None of these
  - (C) Nonzero
  - (D) Negative
- 9 What is the value of absorbance for the 0.25 molar solution having path length 0.01 m ? (Molar absorptivity = 0.4)
  - (A) 0.22
  - (B) 0.1
  - (C) 0.2
  - (D) 0.15
- 10 One given coloured solution has absorbance 0.06, molar extinction coefficient of 6 × 10<sup>3</sup> at 270 nm and it is taken in 0.1 cm cell. What will be the concentration of this solution ?
  - (A) 1.0 × 10<sup>-4</sup> M
  - (B) 1.0 × 10<sup>-1</sup> M
  - (C) 1.0 × 10<sup>-2</sup> M
  - (D) 1.0 × 10<sup>-3</sup> M

- 11 What do you mean by potentiometry ?  
 (A) Measurement of reduction potential  
 (B) Measurement of pH  
 (C) Measurement of electrical conductivity  
 (D) Measurement of electrochemical potential
- 12 What are the requirements for the satisfactory reference electrode ?  
 (A) All of these  
 (B) Stability  
 (C) Reproducibility  
 (D) Reversibility
- 13 Which types of reference electrodes are known ?  
 (A) All  
 (B) Aqueous  
 (C) Non aqueous  
 (D) Pseudo reference electrode
- 14 Which of the following are the components of reference electrode ?  
 (A) All  
 (B) An internal element  
 (C) Filling solution  
 (D) A contact frit
- 15 Which solution is filled in calomel electrode ?  
 (A) Liquid mercury (B) KCl solution  
 (C) NaCl solution (D)  $\text{Hg}_2\text{Cl}_2$  solution
- 16 Choose correct option with respect of calomel electrode.  
 (A)  $2\text{Hg} + 2\text{Cl}^- \rightarrow \text{HgCl}_2 + 2\text{e}^-$   
 (B)  $\text{Hg}_2\text{Cl}_2 + 2\text{e}^- \rightarrow 2\text{Hg} + 2\text{Cl}^-$   
 (C)  $\text{HgCl}_2 + 2\text{e}^- \rightarrow \text{Hg} + 2\text{Cl}^-$   
 (D)  $\text{Hg} + 2\text{Cl}^- \rightarrow \text{HgCl}_2 + 2\text{e}^-$
- 17 Why Silver-Silver electrode is widely used ?  
 (A) Because of all of these  
 (B) It is simple to construct  
 (C) It is stable  
 (D) It is non-toxic
- 18 How much potential is developed by Silver-Silver electrode, when saturated KCl solution is filled ?  
 (A) 1.000 Volt (B) 0.199 Volt  
 (C) 0.299 Volt (D) 0.000 Volt
- 19 Which of the following are the components of pH meter ?  
 (A) Reference electrode and pH measuring electrode  
 (B) Reference electrode  
 (C) pH measuring electrode  
 (D) None
- 20 What is the pH range for the use of fluoride selective electrode ?  
 (A) 0.0 to 14.0 (B) 3.5 to 8.0  
 (C) 0.0 to 7.0 (D) 7.0 to 14.0

- 21 What is meant by tendency of particles in suspension to settle out of the fluid in which they are entrained ?
- (A) Rotation
  - (B) Centrifugation
  - (C) Electrophoresis
  - (D) Sedimentation
- 22 Which force is experienced by biological particles moving through a viscous medium ?
- (A) None
  - (B) Centrifugal force
  - (C) Frictional force
  - (D) Electrical force
- 23 Give the relationship between applied centrifugal field ( $G$ ) and angular velocity  $\omega$ .
- (A)  $G = \omega r^2$
  - (B)  $G = \omega^2 r$
  - (C)  $G = \omega r$
  - (D)  $G = \omega^2 r^2$
- 24 What is the tube angle in near vertical rotors ?
- (A)  $0^\circ$  to  $10^\circ$
  - (B)  $14^\circ$  to  $40^\circ$
  - (C)  $10^\circ$  to  $15^\circ$
  - (D)  $7^\circ$  to  $10^\circ$
- 25 What are the criteria for successful isopycnic separation ?
- (A) All
  - (B) Density of the sample particle must fall within the limits of the gradient densities.
  - (C) Any gradient length is acceptable.
  - (D) The run time must be sufficient for the particles to band at their isopycnic point.
- 26 What is the applied centrifugal field at a point equivalent to 5 cm from the centre rotation and an angular velocity of  $3000 \text{ rad s}^{-1}$  ?
- (A)  $1.5 \times 10^7 \text{ cm s}^{-2}$
  - (B)  $4.5 \times 10^7 \text{ cm s}^{-2}$
  - (C)  $4.5 \times 10^7 \text{ m s}^{-2}$
  - (D)  $4.5 \times 10^7 \text{ cm min}^{-2}$

- 27 Microscopy is refers to the use of \_\_\_\_\_ or \_\_\_\_\_ to magnify objects.  
(A) Proton, light  
(B) Electron, proton  
(C) Light, electron  
(D) Neutron, light
- 28 General principles involved in light and electron microscopy include  
(A) All  
(B) Wavelength of radiation  
(C) Magnification of an image  
(D) Resolving power and the instrument
- 29 Contrast refers to\_\_\_\_\_  
(A) None of given  
(B) Differences in intensity between two objects  
(C) Differences in intensity between incident light and transmitted light.  
(D) Differences in intensity between two objects, incident light and transmitted light
- 30 Which of the following is not the component of microscope ?  
(A) Detector  
(B) Condenser system  
(C) Specimen stage  
(D) Objective lens system
- 31 When it can be said that light rays are in phase ?  
(A) When rays are perpendicular  
(B) When their crests and troughs are aligned  
(C) When their crests and troughs are not aligned  
(D) When all rays are parallel
- 32 What is used to decrease the numerical aperture ?  
(A) Phase ring  
(B) Iris diaphragm  
(C) Dark field stop  
(D) Aperture stop
- 33 One curie = ?  
(A)  $3.7 \times 10^{15}$  disintegrations per minute  
(B)  $3.7 \times 10^{10}$  disintegrations per minute  
(C)  $3.7 \times 10^{10}$  disintegrations per second  
(D)  $2.22 \times 10^{12}$  disintegrations per second

- 34 Which of the following has least penetrating power ?  
(A) X-rays  
(B) Alpha particles  
(C) Beta particles  
(D) Gamma rays
- 35 What can be used to stop alpha particles ?  
(A) Thick concrete block  
(B) 0.01 mm thick aluminium foil  
(C) 1 cm thick aluminium sheet  
(D) 25 mm thick lead plate
- 36 What are gamma rays ?  
(A) Fast moving proton  
(B) Electromagnetic radiation with shorter wavelength  
(C) Fast moving electron  
(D) Fast moving Helium nucleus
- 37 Choose the correct order of the ability to induce ionization in decreasing manner.  
(A) All  
(B)  $\alpha > \beta > \gamma$   
(C)  $\beta > \gamma > \alpha$   
(D)  $\gamma > \beta > \alpha$
- 38 Which gas is generally filled in Geiger counter ?  
(A) Helium  
(B) Nitrogen  
(C) Oxygen  
(D) Water Vapour
- 39 Autoradiography can be used \_\_\_\_\_.  
(A) All given  
(B) To determine the sites of  $^{45}\text{Ca}$  concentrations in growing bone tissue  
(C) To know the relative distribution of  $^{32}\text{P}$   
(D) To demonstrate localization of  $^3\text{H}$ -labelled thymidine
- 40 In which fields radioisotopes are used ?  
(A) In all given fields  
(B) In clinical field  
(C) In various research laboratories  
(D) In industrial microbiology

- 41 What is the velocity of electromagnetic radiation in space ?
- (A)  $3 \times 10^8$  cm minutes<sup>-1</sup>
  - (B)  $3 \times 10^8$  ms<sup>-1</sup>
  - (C)  $3 \times 10^8$  cms<sup>-1</sup>
  - (D)  $3 \times 10^8$  m minutes<sup>-1</sup>
- 42 What do you meant by frequency ?
- (A) None of these
  - (B) The number of waves that passing through a given point per second
  - (C) The distance between two successive wave crests
  - (D) The number of waves per unit length
- 43 Which of the following factors can influence the absorption of light ?
- (A) All
  - (B) The basic ability of the absorbing substance to absorb
  - (C) The amount of absorbing substance in the light path
  - (D) Path-length
- 44 Which of the following is the correct statement for Lambert's law ?
- (A) Light absorbed is inversely proportional to concentration of absorbing solute in the solution
  - (B) Light absorbed is directly proportional to concentration of absorbing solute in the solution.
  - (C) Light absorbed by a solution is directly proportional to the length of the light path
  - (D) Light absorbed by a solution is inversely proportional to the length of the light path
- 45 Which of the following solution will obey Beer's Law ?
- (A) All
  - (B) 0.1 M CuSO<sub>4</sub> solution
  - (C) 1.0 M CuSO<sub>4</sub> solution
  - (D) 0.001 M CuSO<sub>4</sub> solution

- 46 Which of the following law cannot be verified by colorimeter ?
- (A) None of these
  - (B) Beer's law
  - (C) Combined law
  - (D) Lambert's laws
- 47 Which of the following is correct ?
- (A)  $\lambda = hc$
  - (B)  $v = \frac{\lambda}{c}$
  - (C)  $v = \frac{c}{\lambda}$
  - (D)  $\lambda = v \times c$
- 48 Which of following is correct with respect to Beer's Law ?
- (A) Not applicable to coloured solution
  - (B) Not applicable for highly concentrated solution
  - (C) Applicable to highly concentrated solution
  - (D) Not applicable for diluted solution
- 49 When the source of radiation extends into the ultraviolet region of the spectrum; the instrument is known as \_\_\_\_\_.
- (A) Galvanometer
  - (B) Spectrophotometer
  - (C) Colorimeter
  - (D) Chromatograph
- 50 Which of the following can be used as the source of spectrophotometer ?
- (A) Tungsten halogen lamp
  - (B) All
  - (C) Deuterium lamp
  - (D) Hydrogen discharge lamp