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DF-1672

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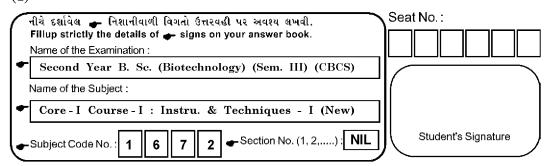### March / April - 2016
Core - I Course - I : Instrumentation & Techniques - I
(New Course)

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.

Name of the Examination :

☛ | Second Year B. Sc. (Biotechnology) (Sem. III) (CBCS) |

Name of the Subject :

☛ | Core - I Course - I : Instru. & Techniques - I (New) |

☛ Subject Code No. : | 1 | 6 | 7 | 2 | ☛ Section No. (1, 2,......) : | NIL |

Seat No. :

Student's Signature

(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.

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1   What is the velocity of electromagnetic radiation in space ?

(A) 3×10^8 m minutes^{-1}

(B) 3×10^8 cm minutes^{-1}

(C) 3×10^8 ms^{-1}

(D) 3×10^8 cms^{-1}

2   What do you meant by frequency ?

(A)   The number of waves per unit length

(B)   None of these

(C)   The number of waves that passing through a given point per second

(D)   The distance between two successive wave crests

3   Which of the following factors can influence the absorption of light ?

(A)   Path-length

(B)   All

(C)   The basic ability of the absorbing substance to absorb

(D)   The amount of absorbing substance in the light path

4   Which of the following is the correct statement for Lambert's law ?

(A)   Light absorbed by a solution is inversely proportional to the length of the light path

(B)   Light absorbed is inversely proportional to concentration of absorbing solute in the solution

(C)   Light absorbed is directly proportional to concentration of absorbing solute in the solution.

(D)   Light absorbed by a solution is directly proportional to the length of the light path

5   Which of the following solution will obey Beer's Law ?

(A)   0.001 M $CuSO_4$ solution

(B)   All

(C)   0.1 M $CuSo_4$ solution

(D)   1.0 M $CuSO_4$ solution

6 Which of the following law cannot be verified by colorimeter ?

(A) Lambert's law

(B) None of these

(C) Beer's law

(D) Combined law

7 Which of the following is correct ?

(A) $\lambda = v \times c$

(B) $\lambda = hc$

(C) $v = \dfrac{\lambda}{c}$

(D) $v = \dfrac{c}{\lambda}$

8 Which of following is correct with respect to Beer's Law ?

(A) Not applicable for diluted solution

(B) Not applicable to coloured solution

(C) Not applicable for highly concentrated solution

(D) Applicable to highly concentrated solution

9 When the source of radiation extends into the ultraviolet region of the spectrum; the instrument is known as _____.

(A) Chromatograph

(B) Galvanometer

(C) Spectrophotometer

(D) Colorimeter

10 Which of the following can be used as the source of spectrophotometer ?

(A) Hydrogen discharge lamp

(B) Tungsten halogen lamp

(C) All

(D) Deuterium lamp

11 Why is it generally preferable to use absorbance as a measure of absorption rather than % transmittance ?
   (A) Because absorbance is proportional to the concentration of the analyte, whereas %T is not
   (B) None
   (C) Becuse %T cannot be measured as accurately as absorbance
   (D) Because %T is dependent on the power of the incident radiation

12 Cuvettes are made from _____ glass.
   (A) Safety glass   (B) Toughened glass
   (C) Simple glass   (D) Borosilicate glass

13 The effect of interference of CO_2 and H_2O on absorbance can be removed much more by using _____.
   (A) Single beam spectrophotometer
   (B) Conductometer
   (C) Double beam spectrophotometer
   (D) Colorimeter

14 Which of the following are the characteristics of fluorescence ?
   (A) Fluorescence depends upon nature of solvent
   (B) All
   (C) Fluorescence is instantaneous
   (D) Emission occurs within a nanosecond

15 Re-emission of excess readiation in fluorescence takes place within _____.
   (A) 10^{-4} to 20 seconds of absorption
   (B) 1 to 2 minutes
   (C) 10^{-4} to 10^{-8} second of absorption
   (D) 10^{-8} to 10^{-4} second absorption

16 Identify correct statement from following :
   (A) The excited states are stable
   (B) Fluorescence is delayed luminescence
   (C) The life time of phosphorescence is much longer than fluorescence
   (D) The life time of phosphorescence is much shorter than fluorescence

17 In triplet state of excitation spin of electrons _____
   (A) Cannot be said   (B) Paired
   (C) Parallel   (D) Opposite

18 What will be the net spin in singlet excited state ?
   (A) Negative   (B) Zero
   (C) None of these   (D) Nonzero

19 What is the value of absorbance for the 0.25 molar solution having path length 0.01 m ? (Molar absorptivity = 0.4)
   (A) 0.15   (B) 0.22
   (C) 0.1   (D) 0.2

20 One given coloured solution has absorbance 0.06, molar extinction coefficient of 6×10^3 at 270 nm and it is taken in 0.1 cm cell. What will be the concentration of this solution ?
   (A) 1.0×10^{-3} M   (B) 1.0×10^{-4} M
   (C) 1.0×10^{-1} M   (D) 1.0×10^{-2} M

21 What do you meant by potentiometry ?
(A) Measurement of electrochemical potential
(B) Measurement of reduction potential
(C) Measurement of pH
(D) Measurement of electrical conductivity

22 What are the requirements for the satisfactory reference electrode ?
(A) Reversibility
(B) All of these
(C) Stability
(D) Reproducibility

23 Which types of reference electrodes are known ?
(A) Pseudo reference electrode
(B) All
(C) Aqueous
(D) Non aqueous

24 Which of the following are the components of reference electrode ?
(A) A contact frit
(B) All
(C) An internal element
(D) Filling solution

25 Which solution is filled in calomel electrode ?
(A) Hg_2Cl_2 solution   (B) Liquid mercury
(C) KCl solution   (D) NaCl solution

26 Choose correct option with respect of calomel electrode.
(A) $Hg + 2Cl^- \rightarrow HgCl_2 + 2e^-$
(B) $2Hg + 2Cl^- \rightarrow HgCl_2 + 2e^-$
(C) $Hg_2Cl_2 + 2e \rightarrow 2Hg + 2Cl^-$
(D) $HgCl_2 + 2e^- \rightarrow Hg + 2Cl^-$

27 Why Silver-Silver electrode is widely used ?
(A) It is non-toxic
(B) Because of all of these
(C) It is simple to construct
(D) It is stable

28 How much potential is developed by Silver-Silver electrode, when saturated KCl solution is filled ?
(A) 0.000 Volt   (B) 1.000 Volt
(C) 0.199 Volt   (D) 0.299 Volt

29 Which of the following are the components of pH meter ?
(A) None
(B) Reference electrode and pH measuring electrode
(C) Reference electrode
(D) pH measuring electrode

30 What is the pH range for the use of fluoride selective electrode ?
(A) 7.0 to 14.0   (B) 0.0 to 14.0
(C) 3.5 to 8.0   (D) 0.0 to 7.0

31 What is meant by tendency of particles in suspension to settle out of the fluid in which they are entrained ?
(A) Sedimentation
(B) Rotation
(C) Centrifugation
(D) Electrophoresis

32 Which force is experienced by biological particles moving through a viscous medium ?
(A) Electrical force
(B) None
(C) Centrifugal force
(D) Frictional force

33 Give the relationship between applied centrifugal field (G) and angular velocity ω.

(A) $G = \omega^2 r^2$

(B) $G = \omega r^2$

(C) $G = \omega^2 r$

(D) $G = \omega r$

34 What is the tube angle in near vertical rotors ?
(A) 7° to 10°
(B) 0° to 10°
(C) 14° to 40°
(D) 10° to 15°

35 What are the criteria for successful isopycnic separation ?
(A) The run time must be sufficient for the particles to band at their isopycnic point.
(B) All
(C) Density of the sample particle must fall within the limits of the gradient densities.
(D) Any gradient length is acceptable.

36 What is the applied centrifugal field at a point equivalent to 5 cm from the centre rotation and an angular velocity of 3000 rad s^{-1} ?
(A) 4.5×10^7 cm min^{-2}
(B) 1.5×10^7 cm s^{-2}
(C) 4.5×10^7 cm s^{-2}
(D) 4.5×10^7 m s^{-2}

37 Microscopy is refers to the use of _____ or _____ to magnify objects.
    (A) Neutron, light
    (B) Proton, light
    (C) Electron, proton
    (D) Light, electron

38 General principles involved in light and electron microscopy include
    (A) Resolving power and the instrument
    (B) All
    (C) Wavelength of radiation
    (D) Magnification of an image

39 Contrast refers to_____.
    (A) Differences in intensity between two objects, incident light and transmitted light
    (B) None of given
    (C) Differences in intensity between two objects
    (D) Differences in intensity between incident light and transmitted light.

40 Which of the following is not the component of microscope ?
    (A) Objective lens system
    (B) Detector
    (C) Condenser system
    (D) Specimen stage

41 When it can be said that light rays are in phase ?
    (A) When all rays are parallel
    (B) When rays are perpendicular
    (C) When their crests and troughs are aligned
    (D) When their crests and troughs are not aligned

42 What is used to decrease the numerical aperture ?
    (A) Aperture stop
    (B) Phase ring
    (C) Iris diaphragm
    (D) Dark field stop

43 One curie = ?
    (A) 2.22×10^{12} disintegrations per second
    (B) 3.7×10^{15} disintegrations per minute
    (C) 3.7×10^{10} disintegrations per minute
    (D) 3.7×10^{10} disintegrations per second

44 Which of the following has least penetrating power ?
(A) Gamma rays
(B) X-rays
(C) Alpha particles
(D) Beta particles

45 What can be used to stop alpha particles ?
(A) 25 mm thick lead plate
(B) Thick concrete block
(C) 0.01 mm thick aluminium foil
(D) 1 cm thick aluminium sheet

46 What are gamma rays ?
(A) Fast moving Helium nucleus
(B) Fast moving proton
(C) Electromagnetic radiation with shorter wavelength
(D) Fast moving electron

47 Choose the correct order of the ability to induce ionization in decreasing manner.
(A) $\gamma > \beta > \alpha$
(B) All
(C) $\alpha > \beta > \gamma$
(D) $\beta > \gamma > \alpha$

48 Which gas is generally filled in Geiger counter ?
(A) Water Vapour
(B) Helium
(C) Nitrogen
(D) Oxygen

49 Autoradiography can be used _____.
(A) To demonstrate localization of ^{3}H-labelled thymidine
(B) All given
(C) To determine the sites of ^{45}Ca concentrations in growing bone tissue
(D) To know the relative distribution of ^{32}P

50 In which fields radioisotopes are used ?
(A) In industrial microbiology
(B) In all given fields
(C) In clinical field
(D) In various research laboratories