

**CET for B.Sc. Nursing /B.Sc. Paramedical /B.Sc. Technology Courses-2023****QUESTION BOOKLET****INSTRUCTIONS**

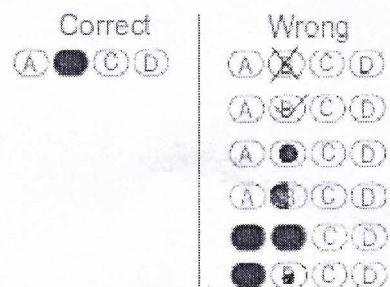
Maximum Time Allowed: 3 Hours  
Negative Marking: 0.25 Marks

No. of Questions: 180  
Maximum Marks :180

Roll Number: Answer Sheet Number: 

- 1) **Check the Booklet thoroughly:** In case of any defect Misprint, Missing question(s), Missing page, Blank page, Damaged or Defaced page, or duplication of question(s) / Page(s), get the Booklet changed with the Booklet of the same series from the Room Invigilator. No complaint shall be entertained after the Entrance Test is over.
- 2) Write your Roll Number and the OMR Answer Sheet Number on the Question Booklet.
- 3) Mark carefully your Roll Number, Question Booklet Number and Question Booklet Series on the OMR Answer Sheet and sign at the appropriate place. Candidates shall be personally responsible for any mistake committed in making these entries in the OMR Answer Sheet. Board shall under no circumstances be responsible for any such mistake.
- 4) Strictly follow the instructions given by the Centre Supervisor / Room Invigilator and those given on the Question Booklet.
- 5) Candidates are not allowed to carry any papers, notes, books, calculators, cellular phones, scanning devices, pagers etc. to the Examination Hall. Any candidate found using, or in possession of, such unauthorized material or indulging in copying or impersonation or adopting unfair means / reporting late / without Admit Card will be debarred from the Entrance Test.
- 6) Please mark the right responses on the OMR Sheet with ONLY a Blue/Black ball point pen. Use of eraser, whitener (fluid) and cutting on the OMR Answer Sheet is NOT allowed.
- 7) The test is of objective type, containing multiple choice questions (MCQs). Each objective question is followed by four responses. You are required to choose the correct/best response and mark your response on the OMR Answer Sheet and NOT on the Question Booklet.
- 8) There will be negative marking of 0.25 marks for every wrong answer.

- 9) For marking response to a question, completely darken the CIRCLE so that the alphabet inside the CIRCLE is not visible. Darken only ONE circle for each question. If you darken more than one circle, it will be treated as a wrong answer. The CORRECT and the WRONG method of darkening the CIRCLE on the OMR Answer Sheet are shown below.



- 10) Please be careful while marking the response to questions. The response once marked cannot be changed and if done shall be treated as a wrong answer.
- 11) In view of the limited time, do NOT waste your time on a question which you find difficult during the test.
- 12) DO NOT make any stray or faint mark anywhere in or around the oval on the OMR Answer Sheet. It will be read as double shading and will make answer invalid. DO NOT fold or wrinkle the OMR Answer Sheet.
- 13) Rough work MUST NOT be done on the OMR Answer Sheet. Use rough page of your Question Booklet for this purpose.
- 14) Candidates are provided carbonless OMR Answer Sheet, having original copy and candidate's copy. After completing the examination, candidates are directed to fold at perforation on the top of the sheet, tear it to separate original copy and candidate's copy and then hand over the original copy of OMR Answer Sheet to the Room Invigilator and retain candidate's copy.

**DO NOT OPEN THE SEAL OF THIS BOOKLET UNTIL TOLD TO DO SO**

SEAL

**PHYSICS**

- Q1.** The dimensional formula for angular momentum is same as that for:  
 A) torque                    B) plank's constant  
 C) gravitational constant D) impulse
- Q2.** The least count of a stop watch is 0.1s. The time of 20 oscillations of the pendulum is found to be 20s. The percentage error in the time period is  
 A) 0.25%                    B) 0.75%  
 C) 0.50%                    D) 1.0%
- Q3.** When a body is dropped from a tower, then there is an increase in its  
 A) mass                      B) velocity  
 C) acceleration              D) potential energy
- Q4.** Two bullets are fired simultaneously horizontally and with different speeds from the same place. Which bullet will hit the ground first?  
 A) The slower one  
 B) The faster one  
 C) Both will reach simultaneously  
 D) Depends on the masses
- Q5.** If a body *A* of mass *M* is thrown with velocity *v* at angle of  $30^\circ$  to the horizontal and another body *B* of the same mass is thrown with the same speed at an angle of  $60^\circ$  to the horizontal, the ratio of the horizontal ranges of *A* and *B* will be  
 A)  $1 : 3$                     B)  $1 : 1$   
 C)  $\sqrt{3} : 1$                 D)  $1 : \sqrt{3}$
- Q6.** Ratio of force and acceleration measures:  
 A) inertia                    B) velocity  
 C) impulse                    D) momentum
- Q7.** A car sometimes overturns while taking a turn. When it overturns, it is  
 A) the inner wheel, which leaves the ground first  
 B) the outer wheel, which leaves the ground first  
 C) both the wheels leaves the ground simultaneously  
 D) either wheel, which leave the ground first
- Q8.** The work performed on an object does not depend upon  
 A) the displacement  
 B) the force applied  
 C) the angle at which the force is applied to the displacement  
 D) initial velocity of the object

- Q9.** A man weighing 50 kg carries a load of 10 kg to the top of the building in 5 minutes. The work done by him is  $10^5$  J. If he carries the same load in 10 minutes, the work done by him will be:  
 A)  $10^5$  J                    B)  $5 \times 10^5$  J  
 C)  $12 \times 10^5$  J            D)  $2.5 \times 10^5$  J
- Q10.** The pendulum consists of a sphere of mass *m* suspended with a flexible wire of length *l*. If the breaking strength of the wire is  $2mg$ , then the angular displacement that can be given to the pendulum is  
 A)  $30^\circ$                     B)  $45^\circ$   
 C)  $60^\circ$                     D)  $90^\circ$
- Q11.** Three thin iron rods each of mass *M* and length *l* are welded so as to form an equilateral triangle. The M.I. about the axis passing through the C.M. and perpendicular to its plane is  
 A)  $ML^2$                     B)  $ML^2/3$   
 C)  $ML^2/2$                 D)  $ML^2/4$
- Q12.** A satellite is orbiting around the Earth with a period *T*. If the Earth suddenly shrinks to half its radius without change in mass, the period of revolution of the satellite will be  
 A) *T*                      B) *T/2*  
 C)  $T/\sqrt{2}$               D)  $2T$
- Q13.** A projectile is fired with a velocity less than the escape velocity. What can we say about the sum of its potential and kinetic energies?  
 A) Negative  
 B) Positive  
 C) Zero  
 D) May be +ve, -ve or zero
- Q14.** Hydraulic brakes work on the basis of:  
 A) Poiseuille's law  
 B) Pascal's law  
 C) Archimedes's principle  
 D) Bernoulli's principle
- Q15.** Two wires *A* and *B* are of the same material, but *A* is half as long and has diameter three times the diameter of wire *B*. If they are stretched by the same amount, then the required force in wire *A* must be  
 A) three times that on *B*  
 B) one third that on *B*  
 C) nine times that on *B*  
 D) eighteen times that on *B*

Q16. The efficiency of a Carnot engine working between  $227^{\circ}\text{C}$  and  $27^{\circ}\text{C}$  is

- A) 100%      B) 50%  
C) 40%      D) 20%

Q17. The freezer in a refrigerator is located in the top section so that:

- A) motor is not heated  
B) heat gained from the environment is more  
C) heat gained from the environment is less  
D) the entire chamber of the refrigerator is cooled quickly

Q18. The relation between velocity of sound  $v_s$  in gas and rms velocity of molecules of gas  $v_{rms}$  is:

- A)  $v_s/v_{rms} = 1$       B)  $v_s/v_{rms} = \sqrt{\gamma}$   
C)  $v_s/v_{rms} = \sqrt{\frac{3}{\gamma}}$       D)  $v_s/v_{rms} = \sqrt{\frac{\gamma}{3}}$

Q19. The energy associated with each degree of freedom of a gas molecule is

- A) zero      B)  $1/2 kT$   
C)  $kT$       D)  $3/2 kT$

Q20. The force constant of a simple pendulum is

- A) directly proportional to the length of the pendulum  
B) directly proportional to the mass of the bob  
C) inversely proportional to both the mass of the bob and the length of the pendulum  
D) independent of the mass of the bob as well as length of the pendulum

Q21. Resonant vibrations are a special case of:

- A) free vibrations      B) natural vibrations  
C) forced vibrations      D) damped vibrations

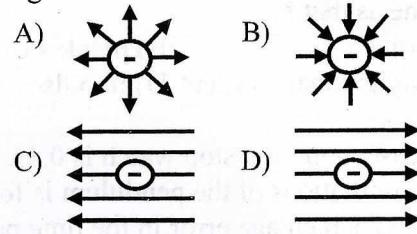
Q22. Name the type of vibrations that are produced in a sitar wire

- A) progressive transverse  
B) progressive longitudinal  
C) stationary longitudinal  
D) stationary transverse

Q23. A source of sound moves towards a stationary listener. The apparent pitch of the sound is found to be higher than its actual value. This happens because

- A) wavelength of the sound increases  
B) wavelength of the sound decreases  
C) the number of waves received by the listener decreases  
D) the number of waves received by the listener increases

Q24. Which of the following figures represent the electric field lines due to a single negative charge?



Q25. Which of the following statements is not true about Gauss's law?

- A) Gauss's law is true for any closed surface  
B) The term  $q$  on the right side of Gauss's law includes the sum of all charges enclosed by the surface  
C) Gauss's law is not much useful in calculating electrostatic field when the system has some symmetry  
D) Gauss's law is based on the inverse square dependence on distance contained in the coulomb's law

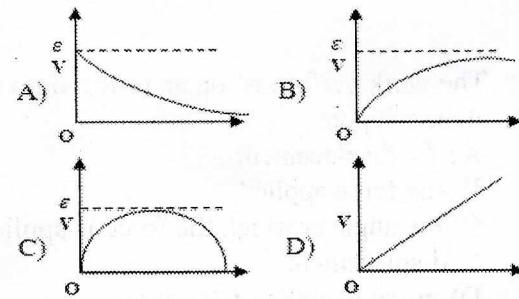
Q26. 1 volt is equivalent to

- A)  $\frac{\text{newton}}{\text{second}}$       B)  $\frac{\text{newton}}{\text{coulomb}}$   
C)  $\frac{\text{joule}}{\text{coulomb}}$       D)  $\frac{\text{joule}}{\text{second}}$

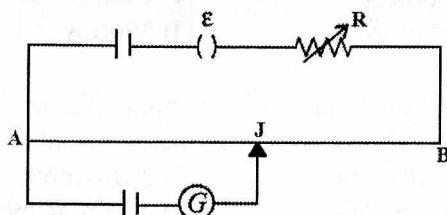
Q27. Two identical capacitors are joined in parallel, charged to a potential  $V$ , separated and then connected in series; the positive plate of one is connected to the negative of the other. Which of the following is true?

- A) The charges on the free plates connected together are destroyed  
B) The energy stored in this system increases  
C) The potential difference between the free plates is  $2V$   
D) The potential difference remains constant

Q28. A cell having an emf  $\epsilon$  and internal resistance  $r$  is connected across a variable external resistance  $R$ . As the resistance  $R$  is increased, the plot of potential difference  $V$  across  $R$  is given by



Q29.  $AB$  is a wire of potentiometer with the increase in the value of resistance  $R$ , the shift in the balance point  $J$  will be



- A) towards  $B$
- B) towards  $A$
- C) remains constant
- D) first towards  $B$  then back towards  $A$

Q30. The resistivity of alloy manganin is

- A) Nearly independent of temperature
- B) Increases rapidly with increase in temperature
- C) Decreases with increase in temperature
- D) Increases rapidly with decrease in temperature

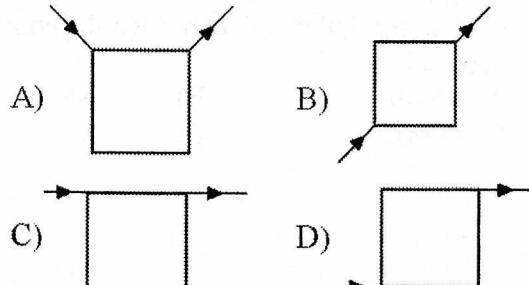
Q31. Combine three resistors  $5\ \Omega$ ,  $4.5\ \Omega$  and  $3\ \Omega$  in such a way that the total resistance of this combination is maximum

- A)  $12.5\ \Omega$
- B)  $13.5\ \Omega$
- C)  $14.5\ \Omega$
- D)  $16.5\ \Omega$

Q32. If an electron is moving with velocity  $\vec{v}$  produces a magnetic field  $\vec{B}$ , then

- A) the direction of field  $\vec{B}$  will be same as the direction of velocity  $\vec{v}$
- B) the direction of field  $\vec{B}$  will be opposite to the direction of velocity  $\vec{v}$
- C) the direction of field  $\vec{B}$  will be perpendicular to the direction of velocity  $\vec{v}$
- D) the direction of field  $\vec{B}$  does not depend upon the direction of velocity  $\vec{v}$

Q33. Current flows through uniform, square frames as shown in the figure. In which case is the magnetic field at the centre of the frame not zero?



Q34. Two alpha-particles have the ratio of their velocities as 3:2 on entering the field. If they move in different circular paths, then the ratio of the radii of their paths is:

- A) 2 : 3
- B) 3 : 2
- C) 9 : 4
- D) 4 : 9

Q35. Which of the following is responsible for the earth's magnetic field?

- A) Convective currents in earth's core.
- B) Divergent current in earth's core.
- C) Rotational motion of earth.
- D) Translational motion of earth.

Q36. A long solenoid has 1000 turns per metre and carries a current of  $1\ A$ . It has a soft iron core of  $\mu_r = 1000$ . The core is heated beyond the Curie temperature,  $T_c$ .

- A) The  $H$  field in the solenoid is (nearly) unchanged but the  $B$  field decreases drastically.
- B) The  $H$  and  $B$  fields in the solenoid are nearly unchanged.
- C) The magnetisation in the core reverses direction.
- D) The magnetisation in the core does not diminish.

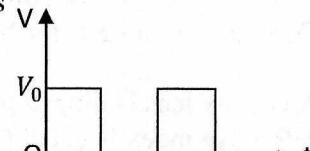
Q37. Two identical coaxial coils  $P$  and  $Q$  carrying equal amount of current in the same direction are brought nearer. The current in

- A)  $P$  increases while in  $Q$  decreases
- B)  $Q$  increases while in  $P$  decreases
- C) both  $P$  and  $Q$  increases
- D) both  $P$  and  $Q$  decreases

Q38. Two coils of self inductance  $2\ mH$  and  $8mH$  are placed so closed together that the effective flux in one coil is completely linked with other. The mutual inductance between these coils is:

- A)  $4\ mH$
- B)  $16\ mH$
- C)  $10\ mH$
- D)  $6\ mH$

Q39. The rms value of potential difference  $V$  shown in the figure is

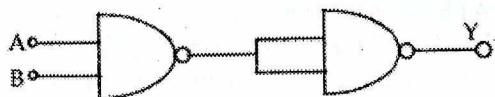


- A)  $\frac{V_0}{\sqrt{3}}$
- B)  $V_0$
- C)  $\frac{V_0}{\sqrt{2}}$
- D)  $\frac{V_0}{2}$

- Q40. In a series LCR circuit the voltage across an inductor, capacitor and resistor are 20 V, 20 V and 40 V respectively. The phase difference between the applied voltage and the current in the circuit is  
 A)  $30^\circ$       B)  $45^\circ$   
 C)  $60^\circ$       D)  $0^\circ$
- Q41. If E and B denote electric and magnetic fields respectively, which of the following is dimensionless?  
 A)  $\sqrt{\mu_0 \epsilon_0} \frac{E}{B}$       B)  $\mu_0 \epsilon_0 \frac{E}{B}$   
 C)  $\mu_0 \epsilon_0 \left(\frac{B}{E}\right)^2$       D)  $\frac{E}{\epsilon_0} \frac{\mu_0}{B}$
- Q42. The waves used by artificial satellites for communication is  
 A) microwaves      B) infrared waves  
 C) radio waves      D) X-rays
- Q43. For a total internal reflection, which of the following is correct?  
 A) Light travels from rarer to denser medium.  
 B) Light travels from denser to rarer medium.  
 C) Light travels in air only.  
 D) Light travels in water only.
- Q44. Which of the following colours of white light deviated most when passes through a prism?  
 A) Red light      B) Violet light  
 C) Yellow light      D) Both (A) and (B)
- Q45. Two lenses of focal lengths 20 cm and -40 cm are held in contact. The image of an object at infinity will be formed by the combination at  
 A) 10 cm      B) 20 cm  
 C) 40 cm      D) infinity
- Q46. Two beams of red and violet color are made to pass separately through a prism (angle of the prism is  $60^\circ$ ). In the position of minimum deviation, the angle of refraction will be  
 A)  $30^\circ$  for both the colors  
 B) greater for the violet color  
 C) greater for the red color  
 D) equal but not  $30^\circ$  for both the colors
- Q47. A convex lens is dipped in a liquid whose refractive index is equal to the refractive index of the lens. Then its focal length will  
 A) become zero  
 B) become infinite  
 C) become small, but non-zero  
 D) remain unchanged

- Q48. The refractive index of glass is 1.5 for light waves of  $\lambda = 6000 \text{ Å}$  in vacuum. Its wavelength in glass is  
 A) 2000 Å      B) 4000 Å  
 C) 1000 Å      D) 3000 Å
- Q49. The phenomena which is not explained by Huygen's construction of wave front  
 A) reflection      B) diffraction  
 C) refraction      D) origin of spectra
- Q50. The velocity of light in air is  $3 \times 10^8 \text{ ms}^{-1}$  and that in water is  $2.2 \times 10^8 \text{ ms}^{-1}$ . The polarising angle of incidence is  
 A)  $45^\circ$       B)  $50^\circ$   
 C)  $53.74^\circ$       D)  $63^\circ$
- Q51. The de-Broglie wavelength of an electron moving with a speed of  $6.6 \times 10^5 \text{ ms}^{-1}$  is nearly equal to  
 A)  $10^{-11} \text{ m}$       B)  $10^{-9} \text{ m}$   
 C)  $10^{-7} \text{ m}$       D)  $10^{-5} \text{ m}$
- Q52. A hydrogen atom is in the p-state. For this, values of J are  
 A)  $5/2, 3/2, 1/2$       B)  $3/2, 1/2$   
 C)  $-1/2, 1/2, 3/2$       D)  $-1/2, -3/2$
- Q53. The binding energy per nucleon is almost constant for many nuclei. It shows that nuclear forces are  
 A) charge independent      B) saturated in nature  
 C) short range in nature      D) attractive in nature
- Q54. If 10 % of a radioactive material decays in 5 days, then the amount of the original material left after 20 days is nearly.  
 A) 60%      B) 70%  
 C) 75%      D) 66%
- Q55. In a semiconductor, the forbidden energy gap between the valence band and the conduction band is of the order of:  
 A) 1 Mev      B) 1 ev  
 C) 0.1 Mev      D) 5 ev
- Q56. In an n-p-n transistor circuit the collector current is 18 mA. If 90% of the electrons emitted reach the collector, then the emitter current is:  
 A) 1.6 mA      B) 16.4 mA  
 C) 18 mA      D) 20 mA

Q57. The following logic symbol is equivalent to:



- A) AND gate      B) OR gate  
C) NOT gate      D) NAND gate

Q58. A truth table is given below. Which of the following has this type of truth table?

X	Y	Z
0	0	0
0	1	1
1	0	1
1	1	0

- A) XOR gate      B) NOR gate  
C) AND gate      D) OR gate

Q59. The modulation index in amplitude modulation is:

- A) always zero      B) between 0 and 1  
C) between 1 and  $\infty$       D) none of these

Q60. Television signals are  
A) amplitude modulated  
B) frequency modulated  
C) phase modulated  
D) both frequency and amplitude modulated

## CHEMISTRY

Q61. What's the number of entities or particles together in mole concept known as?

- A) Boltzmann constant  
B) Avogadro's number  
C) Universal gas constant  
D) Reynold's number

Q62. How many orbitals can have the following set of quantum numbers?  
 $n=3, l=1, m_l=0$

- A) 1      B) 2  
C) 3      D) 4

Q63. The Aufbau Principle states that \_\_\_\_\_.  
A) only two electrons can occupy an orbital  
B) electrons enter the lowest available energy level  
C) electrons remain unpaired if possible  
D) orbitals are regions in space where one is likely to find an electron

Q64. Which of the following pair cannot act both as Bronsted acid as well as Bronsted base:  
A)  $\text{HSO}_4^-$ ,  $\text{OH}^-$       B)  $\text{H}_2\text{SO}_4$ ,  $\text{HCO}_3^-$   
C)  $\text{H}_2\text{O}$ ,  $\text{O}^{2-}$       D)  $\text{NH}_4^+$ ,  $\text{OH}^-$

Q65. Le Chatelier Principal is applicable to:

- A) Heterogeneous reaction  
B) Homogeneous reaction  
C) Irreversible reactions  
D) System in equilibrium

Q66. Idea of pH and pOH was put forward by:

- A) Gibbs      B) Einstein  
C) Sorenson      D) Chadwick

Q67. When sparingly soluble salt is in equilibrium with molar concentration of its oppositely charged ion then the product is called:

- A) common effect  
B) solubility product  
C) dissociation constant  
D) dissociation constant for an acid

Q68. The reaction rate constant can be defined as the rate of reaction when each reactant's concentration is \_\_\_\_\_.

- A) Zero  
B) Unity  
C) Doubled the initial concentration  
D) Infinite

Q69. The average rate and instantaneous rate of a reaction are equal:

- A) at the start  
B) at the end  
C) in the middle  
D) when two rates have a time interval equal to zero

Q70. State the Van't Hoff factor ( $i$ ) for a dilute aqueous solution of the strong electrolyte barium hydroxide,  $\text{Ba}(\text{OH})_2$ .

- A) 0      B) 1  
C) 2      D) 3

Q71. A solution made up of numerous components in which each component's property is the weighted sum of its separate properties. The answer is:

- A) Ideal Solution  
B) Non-Ideal solution  
C) Real Solution  
D) None of the mentioned

Q72. The correct relationship between free energy change in a reaction and the corresponding equilibrium constant  $K_C$  is:

- A)  $-\Delta G = RT \ln K_C$       B)  $\Delta G^0 = RT \ln K_C$   
C)  $-\Delta G^0 = RT \ln K_C$       D)  $\Delta G = RT \ln K_C$

Q73. Which of the following statement is true?

- A) A system is in equilibrium state if, when it is disturbed, it comes back to its original state  
B) If there is a spontaneous change in the state, the system is not in equilibrium  
C) During a spontaneous change, the entropy of system increases  
D) All of the mentioned

SET-A

**JKBOPEE (B.Sc. Nursing & Other Courses 2023)**

- |  |   |
|--|---|
| Q74. According to Hess's Law, the thermal effect of a reaction depend upon:<br>A) initial and final conditions of reactants and products<br>B) final conditions of products<br>C) intermediate stage of reaction<br>D) none of these | Q84. Which one of the following is an example of homogenous catalysis?<br>A) Hydrogenation of oil<br>B) Manufacture of ammonia by Haber's process<br>C) Manufacture of sulphuric acid by Contact process<br>D) Hydrolysis of sucrose in presence of dilute hydrochloric acid  |
| Q75. Entropy is an _____ property.<br>A) intensive<br>B) extensive<br>C) neither intensive nor extensive<br>D) both intensive and extensive  | Q85. Which one will have the highest 2nd ionization energy?<br>A) $1s^2 2s^2 2p^6 3s^1$ B) $1s^2 2s^2 2p^4$<br>C) $1s^2 2s^2 2p^6$ D) $1s^2 2s^2 2p^6 3s^2$   |
| Q76. What is the number of electrons transferred in an equation if the Nernst equation is $E(\text{cell}) = E^0(\text{cell}) - 9.83 \times 10^{-3} \times \log 10 (\text{Anode/Cathode})$ ?<br>A) 2      B) 6<br>C) 4      D) 1      | Q86. Covalent character of an ionic compound increase with:<br>A) decrease in anion size<br>B) decrease in cation size<br>C) increase in cation size<br>D) decrease in both cation and anion size   |
| Q77. The quantity of an ion discharged during electrolysis is directly proportional to:<br>A) chemical equivalent of the ion<br>B) time of flow of current<br>C) current strength<br>D) all the above                                | Q87. Find the molecule with the maximum dipole moment.<br>A) $\text{CH}_4$ B) $\text{NH}_3$<br>C) $\text{CO}_2$ D) $\text{NF}_3$  |
| Q78. On dilution, the specific conductance _____.<br>A) Increases      B) Remains same<br>C) Decreases      D) None of the mentioned   | Q88. Which one has a pyramidal shape?<br>A) $\text{SO}_3$ B) $\text{PCl}_3$<br>C) $\text{CO}_3^{2-}$ D) $\text{NO}_3^-$   |
| Q79. The role of diffusion of gases is governed by:<br>A) Graham's law      B) Dalton's law<br>C) Avogadro's law      D) Newton's law  | Q89. In $\text{BrF}_3$ , lone pairs are present at the equatorial positions. This is to minimize:<br>A) bp-bp repulsion only<br>B) lp-lp repulsion only<br>C) lp-bp repulsion only<br>D) both (B) and (C)   |
| Q80. Which one of the following defects in the crystals lowers its density?<br>A) F-centres      B) Schottky defect<br>C) Frenkel defect      D) Interstitial defect   | Q90. Which of the following pairs has the same bond order?<br>A) $\text{O}_2^+$ , $\text{NO}^+$ B) $\text{N}_2$ , $\text{O}_2$<br>C) $\text{O}_2^{2-}$ , $\text{B}_2$ D) $\text{NO}$ , $\text{CO}$  |
| Q81. In a simple cubic, body-centric cubic and face-centered cubic structure the ratio of number of atoms present is respectively:<br>A) 8:1:6      B) 1:2:4<br>C) 4:2:1      D) 4:2:3   | Q91. Does the degree of hydration in alkali metals depend upon the size of the cation?<br>A) Yes      B) No<br>C) Maybe      D) Cannot say  |
| Q82. Which of the following property of solids easily adopt itself to store electrical energy?<br>A) Super conductors      B) Passive dielectric<br>C) Active dielectric      D) Polar molecules                                     | Q92. The correct order of thermal stability of following carbonates is:<br>A) $\text{BaCO}_3 > \text{CaCO}_3 > \text{SrCO}_3 > \text{MgCO}_3$<br>B) $\text{BaCO}_3 > \text{SrCO}_3 > \text{CaCO}_3 > \text{MgCO}_3$<br>C) $\text{MgCO}_3 > \text{CaCO}_3 > \text{SrCO}_3 > \text{BaCO}_3$<br>D) $\text{MgCO}_3 > \text{CaCO}_3 > \text{BaCO}_3 > \text{SrCO}_3$ |
| Q83. The movement of colloidal particles towards the oppositely charged electrodes on a passing electric current is known as:<br>A) Tyndall effect<br>B) Cataphoresis<br>C) Brownian movement<br>D) None of these                    | Q93. The carbon family elements form _____ hydrides:<br>A) metallic<br>B) ionic<br>C) covalent  |

Q94. Which of the following has the strongest bond?

- A) F-Br
- B) F-F
- C) F-Cl
- D) Cl-Br

Q95. Which of the following is an alloy of iron?

- A) Vitallium
- B) Brass
- C) Invar
- D) Solder

Q96. Transition metals are generally coloured because:

- A) they absorb electromagnetic radiations
- B) their penultimate d-subshells are fully filled
- C) of d-d transition
- D) none of the above

Q97. The name of  $[\text{Co}(\text{NH}_2)_3(\text{NO}_2)_3]$  is:

- A) Trinitrotriamminecobalt(III)
- B) Trinitrotriamminecobalt(II)
- C) Trinirtrotriamminecobalt(III) ion
- D) Trinitrotriamminecobalate(III)

Q98. In Crystal Field Theory, which one of the following statements is false?

- A) In an octahedral crystal field, the d electrons on a metal ion occupy the  $e_g$  set of orbitals before they occupy the  $t_{2g}$  set of orbitals.
- B) Diamagnetic metal ions cannot have an odd number of electrons.
- C) Low spin complexes can be paramagnetic.
- D) In high spin octahedral complexes,  $\Delta_{\text{oct}}$  is less than the electron pairing energy, and is relatively very small

Q99. In Valance Bond Theory, magnetic measurements indicate the  $[\text{Co}(\text{OH}_2)_6]^{2+}$  has 3 unpaired electrons. Therefore, the hybridization of the metal's orbitals in  $[\text{Co}(\text{OH}_2)_6]^{2+}$  is:

- A)  $\text{sp}^2\text{d}$
- B)  $\text{dsp}^2$
- C)  $\text{d}^2\text{sp}^3$
- D)  $\text{sp}^3\text{d}^2$

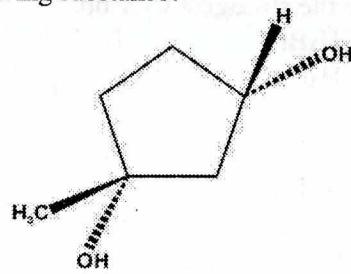
Q100. Which substance is used to determine the hardness of water using a simple titration?

- A) Mg(EDTA)
- B) Fe(EDTA)
- C) Na<sub>2</sub>(EDTA)
- D) Co(EDTA)

Q101. Positive charge of carbocations can be dispersed by \_\_\_\_\_.

- A) (+1) effect of alkyl group
- B) Resonance in allyl or benzyl carbocation
- C) Hyperconjugation in 1°, 2° and 3° carbocations
- D) All of the mentioned

Q102. What is the complete IUPAC name of the following substance?

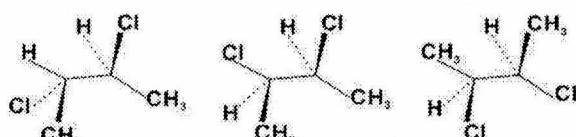


- A) (1R, 3S)-1-methylcyclopentane-1, 3-diol
- B) (1S, 3R)-1-methylcyclopentane-1, 3-diol
- C) (1S, 3S)-1-methylcyclopentane-1, 3-diol
- D) (1R, 3R)-1-methylcyclopentane-1, 3-diol

Q103. Which of the following is not a characteristic property of arenes?

- A) Resonance
- B) Greater stability
- C) Electrophilic additions
- D) Delocalisation of  $\pi$ -electrons

Q104. Which of the following structures represent the same stereoisomer?



- A) Only 1 and 2
- B) Only 2 and 3
- C) 1, 2 and 3
- D) Only 1 and 3

Q105. Process of separating the racemic mixture into optically active isomers is known as:

- A) Racemization
- B) Resolution
- C) Walden inversion
- D) Epimerization

Q106. The configuration of a compound with reference to the arbitrarily assigned configuration is known as:

- A) Absolute configuration
- B) Retention of configuration
- C) Relative configuration
- D) None of A, B, and C

Q107. How is Iodoform typically produced?

- A) by the reaction of iodine and sodium hydroxide
- B) by the reaction of iodine and ethanol
- C) by the reaction of iodine and acetone
- D) by the reaction of iodine and sulphuric acid

**SET-A**

- Q108. Among the following, which alkyl halides have the strongest C-X bond?  
A)  $\text{CH}_3\text{Br}$       B)  $\text{CH}_3\text{Cl}$   
C)  $\text{CH}_3\text{I}$       D)  $\text{CH}_3\text{F}$
- Q109. An ether is more volatile than an alcohol having the same molecular formula. What is the reason for this difference?  
A) dipolar character of ethers  
B) alcohols having resonance structures  
C) inter-molecular hydrogen bonding in ethers  
D) inter-molecular hydrogen bonding in alcohols
- Q110. Reactions occur between Aldehydes and Ketones?  
A) nucleophilic addition  
B) electrophilic substitution  
C) electrophilic addition  
D) nucleophilic substitution
- Q111. Which of the following acids does not form anhydride?  
A) Formic acid      B) Acetic acid  
C) Propionic acid      D) n-butyric acid
- Q112. Ethylamine ( $\text{C}_2\text{H}_7\text{N}$ ) is a stronger base as it is by nature electron:  
A) acceptor      B) donator  
C) exchanger      D) deplete
- Q113. What does alkyl isocyanide on hydrolysis give?  
A) Primary amine  
B) Tertiary amine  
C) Aldehyde  
D) Alcohol
- Q114. Products formed when Nitrobenzene reacts with  $\text{HNO}_3/\text{H}_2\text{SO}_4$  at  $80-100^\circ\text{C}$ ?  
A) 1, 4-Dinitrobenzene  
B) 1, 2, 4-Trinitrobenzene  
C) 1, 2-Dinitrobenzene  
D) 1, 3-Dinitrobenzene
- Q115. Molisch test is used for \_\_\_\_\_.  
A) Lipids  
B) Proteins  
C) Mucoproteins  
D) Flavoproteins
- Q116. Glucose will show mutarotation when solvent is:  
A) Acidic      B) Basic  
C) Amphoteric      D) Neutral

- Q117. Gas molecules that absorb thermal infrared radiation and are present in large quantity to alter the climate system is known as:  
A) Greenhouse gases  
B) Beta radiation  
C) Alfa radiation  
D) Ozone gas

- Q118. Bakelite is obtained from phenol by reacting with:  
A)  $\text{HCHO}$       B)  $(\text{CH}_2\text{OH})_2$   
C)  $\text{CH}_3\text{CHO}$       D)  $\text{CH}_3\text{COCH}_3$

- Q119. Which of the following reaction is not accompanied by elimination of a byproduct molecule?  
A) addition polymerization  
B) condensation polymerization  
C) both of the mentioned  
D) none of the mentioned

- Q120. Which of the following is a non-biodegradable polymer?  
A) PHB      B) PGA  
C) LDPE      D) PHBV

**BIOLOGY**

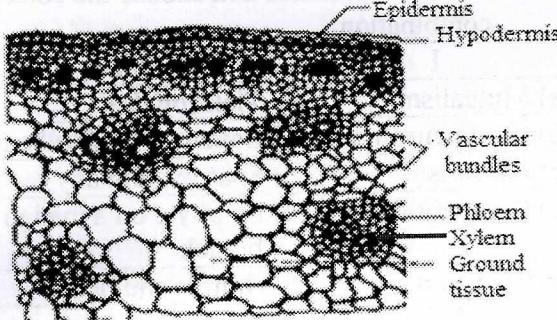
- Q121. If we want to know evolutionary relationship between organisms then which classification will resolve it:

- A) Artificial Classification  
B) Natural Classification  
C) Phylogenetic Classification  
D) Cytotaxonomy

- Q122. Plants having vascular tissue without seeds  
A) Angiosperm      B) Pteridophytes  
C) Bryophytes      D) Gymnosperms

- Q123. Viroids have  
A) Single stranded RNA not enclosed by protein coat  
B) Single stranded DNA not enclosed by protein coat  
C) Double stranded DNA enclosed by protein coat  
D) Double stranded RNA enclosed by protein coat

Q124. The following diagram is of-



- A) Monocot Stem      B) Dicot Stem  
C) Monocot Root      D) Dicot Root

Q125. Cortex is the region found between

- A) Epidermis and Stele  
B) Pericycle and Endodermis  
C) Endodermis and Pith  
D) Endodermis and vascular Bundle

Q126. Which of the following family has Racemose Inflorescence?

- A) Fabaceae      B) Liliaceae  
C) Solanaceae      D) All of these

Q127. Match the following:

Column 1	Column 2
i. Diffusion	a. Pressure by which cut end of a stem exudes xylem sap.
ii. Osmosis	b. Movement of molecules from high to low concentration.
iii. Active transport	c. Movement of molecules from low to high concentration.
iv. Transpiration	d. Movement of molecules through semipermeable membrane.
v. Root pressure	e. Evaporation of water from surface of leaves.

- A) i-c, ii-b, iii-e, iv-a, v-d  
B) i-b, ii-d, iii-c, iv-e, v-a  
C) i-d, ii-b, iii-c, iv-e, v-a  
D) i-b, ii-d, iii-c, iv-a, v-e

Q128. If a pressure greater than atmospheric pressure is applied to a solution its water potential:

- A) Decreases      B) Remains same  
C) Increases      D) Becomes Zero

Q129. Presently which view is considered best for turgor changes in guard cells

- A) Photosynthesis of Chloroplasts in guard cells  
B) Starch is converted into sugar in Guard cells  
C) Starch is converted into glucose in guard cells  
D) Potassium is actively transported into guard cells

Q130. Which of the following is macronutrient-

- A) Ca      B) Mn  
C) Mo      D) Zn

Q131. Nitrogen absorbed by plants is-

- A) Converted to Nitrate  
B) Reduced to ammonia  
C) Changed to nitrite  
D) Combined with Oxygen

Q132. In C4 pathway initial Carbon dioxide fixation occurs in chloroplasts of

- A) Guard Cells      B) Mesophyll  
C) Bundle Sheath      D) All of the above

Q133. Which of these is not a function of auxin?

- A) Inducing callus formation  
B) Inducing dormancy  
C) Enhancing cell division  
D) Maintaining apical dominance

Q134. The fusion of female reproductive nucleus with the male reproductive nucleus is known as

- A) Adoption      B) Excretion  
C) Fertilization      D) Regeneration

Q135. Embryo sac is located inside the

- A) Stigma      B) Ovule  
C) Micropyle      D) Style

Q136. A mass of nutritive material outside the embryo sac is called \_\_\_\_\_

- A) Protoplasm      B) Pericarp  
C) Ectoderm      D) Perisperm

Q137. The process of formation of seeds without fertilization in flowering plants is known as

- A) Budding  
B) Apomixis  
C) Sporulation  
D) Somatic hybridization

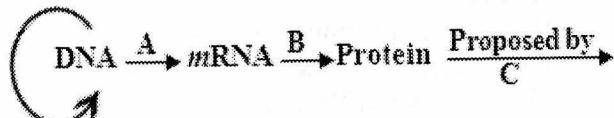
Q138. What is the means of segregation in Law of Segregation?

- A) Allelic Segregation
- B) Chromosomal separation
- C) Linkage
- D) Crossing Over

Q139. During replication, Okazaki fragments elongate

- A) leading strand towards the replication fork
- B) lagging strand towards the replication fork
- C) leading strand away from the replication fork
- D) lagging strand away from the replication fork

Q140. Fill in the blanks from A to C in the below diagram-



- A) A- Transcription, B- Replication, C- James Watson
- B) A- Translation, B- Transcription, C-Ervin Chargaff
- C) A- Transcription, B- Translation, C-Francis Crick
- D) A-Translation, B- Transcription, C-Rosalind Franklin

Q141. This is considered to be the start codon

- |        |        |
|--------|--------|
| A) AGG | B) UAG |
| C) GUG | D) AUG |

Q142. Lac Operon will be turned on when

- A) Lactose is less than glucose
- B) Lactose is less in the medium
- C) Lactose is more than glucose
- D) Glucose is enough in the medium

Q143. Which one statement is correct regarding man-made ecosystems?

- A) They are highly efficient
- B) They are poor in diversity
- C) They are vulnerable to drought, floods and diseases
- D) All are correct

Q144. Peacocks eat snakes that eat frogs. Frogs, in turn, eat the leaves of the plants. The peacock is-

- A) primary consumer
- B) secondary consumer
- C) decomposer
- D) the apex of the food pyramid

Q145. Match the columns and choose the correct combination

I	II
(a) Mutualism	(1) Ticks on dogs
(b) Commensalism	(2) Balance and Chathamalus
(c) Parasitism	(3) Sparrow and any seed
(d) Competition	(4) Epiphyte on a mango branch
(e) Predation	(5) Ophrys and bees

A) a - 1, b - 5, c - 4, d - 3, e - 2

B) a - 2, b - 1, c - 5, d - 4, e - 3

C) a - 3, b - 2, c - 1, d - 5, e - 4

D) a - 5, b - 4, c - 1, d - 2, e - 3

Q146. Which of the following is not a major greenhouse gas?

- |            |                   |
|------------|-------------------|
| A) ozone   | B) water vapour   |
| C) methane | D) carbon dioxide |

Q147. One of the ex-situ conservation method for endangered species is-

- A) Wildlife Sanctuaries
- B) Biosphere Reserves
- C) Cryopreservation
- D) National Parks

Q148. Breeding of crops to increase the levels of essential nutrients, is called

- A) Biofortification.
- B) Biomagnification.
- C) Bioinformatics.
- D) Biotechnology.

Q149. The guts of various ruminants contain-

- A) Acidophiles
- B) Halophiles
- C) Methanogens
- D) All of the above

Q150. Which is a genetically modified crop-

- A) Bt-cotton
- B) Bt-brinjal
- C) Golden rice
- D) All of the above

Q151. Dachigam National Park is famous for-

- A) One horned Rhinoceros
- B) Kashmir Stag (Hangul)
- C) Snow Leopard
- D) Hornbill

Q152. The unique characteristic of Annelida is-

- A) Coelom
- B) Nephridia
- C) Hermaphrodite
- D) All of the above

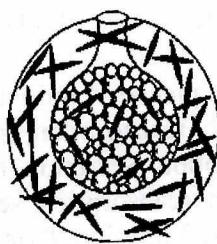
Q153. Microvilli of Epithelial cells –

- A) Increase the surface Area
- B) Protect the cells
- C) Engulf the foreign matter
- D) Give movements to the cell

- Q154. Cockroach respire by means of-
- Skin
  - Book lungs
  - Spiracle
  - Gills
- Q155. Plasma membrane is made up of
- A protein, a lipid and a cellulose layer
  - Bimolecular lipid layer surrounded by protein layers
  - A protein layer between two lipid layers
  - A lipid layer between two protein layers
- Q156. What are the two domains of Prokaryotes-
- Fungi and Algae
  - Protist and Algae
  - Bacteria and Archaea
  - Archaea and Fungi
- Q157. This option gives the correct sequence of events during mitosis
- Condensation -> nuclear membrane disassembly -> crossing over -> segregation -> telophase
  - Condensation -> arrangement at equator -> centromere division -> segregation -> telophase
  - Condensation -> crossing over -> nuclear membrane disassembly -> segregation -> telophase
  - Condensation -> nuclear membrane disassembly -> arrangement at equator -> centromere division -> segregation -> telophase
- Q158. Which statement about enzymes is true
- enzymes accelerate reactions by lowering the activation energy
  - enzymes are proteins whose three-dimensional form is key to their function
  - enzymes do not alter the overall change in free energy for a reaction
  - all of these
- Q159. Name the site where digestion of proteins occurs.
- Pancreas
  - Rectum
  - Liver
  - Ileum
- Q160. A type of proteolytic enzyme is found in infants' gastric juices which helps in the digestion of milk proteins. The name of the enzyme is-
- Peptide
  - Rennin
  - Amylases
  - Oxytocin

- Q161. Respiratory centre is located in-
- Cerebellum
  - Medulla oblongata
  - Cerebrum
  - Diencephalon
- Q162. The right sequence of formation of urine is-
- Secretion, reabsorption, filtration
  - Reabsorption, Secretion, filtration
  - Filtration, reabsorption, secretion
  - Secretion, Filtration, Reabsorption
- Q163. When an individual consumes a large amount of protein, what will he or she will excrete-
- More urea and uric acid
  - More glucose
  - Salt
  - Ammonia
- Q164. The life span of red blood cells is-
- 100 days
  - 110 days
  - 120 days
  - 105 days
- Q165. What should be the blood pressure of a healthy human being-
- 120/80
  - 120/100
  - 110/90
  - 120/130
- Q166. Which of the following is not a neurotransmitter-
- Glutamic Acid
  - Acetylcholine
  - Tyrosine
  - Adrenaline
- Q167. In humans, at the end of the first meiotic division, the male germ cells differentiate into-
- Secondary spermatocytes
  - Spermatogonia
  - Spermatids
  - Annular tubules
- Q168. In human females, meiosis-II is not completed until \_\_\_\_\_
- Uterine implantation
  - Birth
  - Puberty
  - Fertilization
- Q169. Budding is a method of Asexual Reproduction found in-
- Hydra
  - Amoeba
  - Sponges
  - Penicillium

Q170. The following figure represents-



- A) Budding in yeast
- B) Gemmules formation in sponges
- C) Binary fission in Amoeba
- D) Fragmenation

Q171. The function of copper ions in copper releasing IUDs is \_\_\_\_\_

- A) They inhibit gametogenesis
- B) They inhibit ovulation
- C) They suppress sperm motility and fertilising capacity of sperms
- D) All of the above

Q172. Which of the following is not a sexually transmitted disease?

- |                 |              |
|-----------------|--------------|
| A) Encephalitis | B) Syphilis  |
| C) AIDS         | D) Gonorrhea |

Q173. Trisomy of Chromosome 21 leads to-

- A) Turner's syndrome
- B) Down's syndrome
- C) Klinefelter's syndrome
- D) Sickle cell Anemia

Q174. A population will not exist in Hardy-Weinberg equilibrium if \_\_\_\_\_

- A) There are no mutations
- B) Population is large
- C) Individuals mate selectively
- D) Population has not migrated

Q175. The forelimbs of cat, lizard used in walking; forelimbs of whale used in swimming and forelimbs of bats used in flying are examples of \_\_\_\_\_

- A) Adaptive radiation
- B) Convergent evolution
- C) Analogous organs
- D) Homologous organs

Q176. Adults of *Wuchereria bancrofti* attacks-

- A) Respiratory System
- B) Lymphatic System
- C) Excretory System
- D) Circulatory System

Q177. Pick the correct statement

- A) larval form of moth produces silk
- B) salivary glands of the moth produce silk
- C) by boiling, silk is extracted from cocoon of a moth
- D) both (A) and (C)

Q178. This is a consequence of alcohol addiction-

- A) psychosis, hypertension and fatty liver syndrome
- B) cardiovascular diseases, hypertension and fatty liver syndrome
- C) ulcers, all types of mental illness, vitamin deficiency, cardiovascular diseases
- D) all of these

Q179. The gene formed by joining of DNA segments from two different sources are called as-

- A) Recombinant Gene
- B) Chimeric gene
- C) Joined gene
- D) Both A and C

Q180. Find the incorrect statement about plasmids

- A) they are circular
- B) they replicate independently
- C) they are transferrable
- D) they are single stranded