

Q. B. Series: **D**

Q. B. Number: **510044**

CET for B.Sc. Nursing /B.Sc. Paramedical /B.Sc. Technology Courses-2025

QUESTION BOOKLET

INSTRUCTIONS

Maximum Time Allowed: 3 Hours
Negative Marking: 0.25 Marks

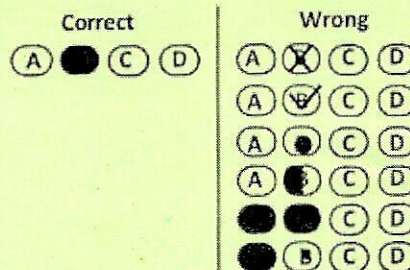
No. of Questions: 180
Maximum Marks :180

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

KEPT INTENTIONALLY BLANK
FOR ROUGH WORK

PHYSICS (Q1 to Q60)

- Q1. In Young's experiment, two coherent sources are placed 0.90 mm apart and fringe are observed one metre away. If it produces second dark fringe at a distance of 1 mm from central fringe, the wavelength of monochromatic light used would be
(a) 60×10^{-4} cm (b) 10×10^{-4} cm
(c) 10×10^{-5} cm (d) 6×10^{-5} cm
- Q2. A parallel beam of monochromatic light of wavelength $5000\text{\AA}$ is incident normally on a single narrow slit of width 0.001 mm. The light is focussed by a convex lens on a screen placed in focal plane. The first minimum will be formed for the angle of diffraction equal to
(a) 0° (b) 15°
(c) 30° (d) 50°
- Q3. The periodic waves of intensities I_1 and I_2 pass through a region at the same time in the same direction. The sum of the maximum and minimum intensities is:
(a) $I_1 + I_2$
(b) $(\sqrt{I_1} + \sqrt{I_2})^2$
(c) $(\sqrt{I_1} - \sqrt{I_2})^2$
(d) $2(I_1 + I_2)$
- Q4. A parallel beam of light of wavelength λ is incident normally on a narrow slit. A diffraction pattern is formed on a screen placed perpendicular to the direction of the incident beam. At the second minimum of the diffraction pattern, the phase difference between the rays coming from the two edges of slit is:
(a) $\pi\lambda$ (b) 2π
(c) 3π (d) 4π
- Q5. The wavelength of a 1 keV photon is 1.24×10^{-9} m. What is the frequency of 1 MeV photon?
(a) 1.24×10^{15}
(b) 2.4×10^{20}
(c) 1.24×10^{18}
(d) $2 \times 4 \times 10^{23}$
- Q6. The photoelectric work function for a metal surface is 4.125 eV. The cut off wavelength for this surface is:
(a) 4125 $\text{\AA}$ (b) 3000 $\text{\AA}$
(c) 6000 $\text{\AA}$ (d) 2062.5 $\text{\AA}$

- Q7. The radius of hydrogen atom in its ground state is 5.3×10^{-11} m. After collision with an electron it is found to have a radius of 21.2×10^{-11} m. What is the principal quantum number n of the final state of the atom?
(a) $n = 4$ (b) $n = 2$
(c) $n = 16$ (d) $n = 3$
- Q8. The energy of a hydrogen atom in the ground state is -13.6 eV. The energy of a He^+ ion in the first excited state will be:
(a) -13.6 eV (b) -27.2 eV
(c) -54.4 eV (d) -6.8 eV
- Q9. Energy released in the fission of a single ${}_{92}\text{U}^{235}$ nucleus is 200 MeV. The fission rate of a ${}_{92}\text{U}^{235}$ fuelled reactor operating at a power level of 5 W is:
(a) $1.56 \times 10^{-10} \text{ s}^{-1}$
(b) $1.56 \times 10^{11} \text{ s}^{-1}$
(c) $1.56 \times 10^{-16} \text{ s}^{-1}$
(d) $1.56 \times 10^{-17} \text{ s}^{-1}$
- Q10. When n-type semiconductor is heated:
(a) number of electrons increases while that of holes decreases
(b) number of holes increases while that of electrons decreases
(c) number of electrons and holes remain same
(d) number of electrons and holes increases equally.
- Q11. The part of the transistor which is heavily doped to produce large number of majority carriers is:
(a) emitter
(b) base
(c) collector
(d) any of the above depending upon the nature of transistor
- Q12. The current gain for a transistor working as common-base amplifier is 0.96. If the emitter current is 7.2 mA, then the base current is:
(a) 0.29 mA (b) 0.35 mA
(c) 0.39 mA (d) 0.43 mA
- Q13. A semi-conducting device is connected in a series circuit with a battery and a resistance. A current is found to pass through the circuit. If the polarity of the battery is reversed, the current drops to almost zero. The device may be:
(a) a p-n junction
(b) an intrinsic semi-conductor
(c) a p-type semi-conductor
(d) an n-type semi-conductor

- Q14. Sky wave propagation is primarily used for communication in which frequency range?
 (a) Very Low Frequency (VLF)
 (b) Medium Frequency (MF) and High Frequency (HF)
 (c) Very High Frequency (VHF)
 (d) Ultra High Frequency (UHF)
- Q15. In amplitude modulation (AM), what parameter of the carrier wave is varied in accordance with the modulating signal?
 (a) Frequency (b) Phase
 (c) Amplitude (d) Velocity
- Q16. Resistances n , each of r ohm, when connected in parallel give an equivalent resistance of R ohm. If these resistances were connected in series, the combination would have a resistance in ohms, equal to:
 (a) nR (b) n^2R
 (c) R/n^2 (d) R/n
- Q17. The magnetic field at a distance r from a long wire carrying current ' i ' is 0.4 tesla. The magnetic field at a distance $2r$ is:
 (a) 0.2 tesla (b) 0.8 tesla
 (c) 0.1 tesla (d) 1.6 tesla
- Q18. Two long parallel wires are at a distance of 1 metre. Both of them carry one ampere of current. The force of attraction per unit length between the two wires is:
 (a) 2×10^{-7} N/m
 (b) 2×10^{-8} N/m
 (c) 5×10^{-8} N/m
 (d) 10^{-7} N/m
- Q19. A coil of one turn is made of a wire of certain length and then from the same length a coil of two turns is made. If the same current is passed in both the cases, then the ratio of the magnetic inductions at their centres will be:
 (a) 2:1 (b) 1:4
 (c) 4:1 (d) 1:2
- Q20. The work done in turning a magnet of magnetic moment M by an angle of 90° from the meridian, is n times the corresponding work done to turn it through an angle of 60° . The value of n is given by:
 (a) 2
 (b) 1
 (c) 0.5
 (d) 0.25
- Q21. Above Curie temperature:
 (a) a paramagnetic substance becomes diamagnetic
 (b) a diamagnetic substance becomes paramagnetic
 (c) a paramagnetic substance becomes ferromagnetic
 (d) a ferromagnetic substance becomes paramagnetic
- Q22. A varying current in a coil change from 10A to zero in 0.5 sec. If the average e.m.f induced in the coil is 220V, the self-inductance of the coil is:
 (a) 5H (b) 6H
 (c) 11H (d) 12H
- Q23. A wire loop is rotated in a magnetic field. The frequency of change of direction of the induced e.m.f. is:
 (a) twice per revolution
 (b) four times per revolution
 (c) six times per revolution
 (d) once per revolution
- Q24. In an experiment, 200 V A.C. is applied at the ends of an LCR circuit. The circuit consists of an inductive reactance (X_L) = 50 Ω , capacitive reactance (X_C) = 50 Ω and ohmic resistance (R) = 10 Ω . The impedance of the circuit is:
 (a) 10 Ω
 (b) 20 Ω
 (c) 30 Ω
 (d) 40 Ω
- Q25. A step-up transformer operates on a 230 V line and supplies a load of 2 ampere. The ratio of the primary and secondary windings is 1:25. The current in the primary is:
 (a) 25 A
 (b) 50 A
 (c) 15 A
 (d) 12.5 A
- Q26. We consider the radiation emitted by the human body. Which of the following statements is true?
 (a) the radiation emitted lies in the ultraviolet region and hence is not visible.
 (b) the radiation emitted is in the infra-red region.
 (c) the radiation is emitted only during the day.
 (d) the radiation is emitted during the summers and absorbed during the winters.

- Q27. The electric field associated with an e.m. wave in vacuum is given by $\vec{E} = \hat{i} 40 \cos(kz - 6 \times 10^8 t)$, where E , z and t are in volt/m, meter and seconds respectively. The value of wave vector k is:
 (a) 2 m^{-1} (b) 0.5 m^{-1}
 (c) 6 m^{-1} (d) 3 m^{-1}
- Q28. Time taken by sunlight to pass through a window of thickness 4 mm whose refractive index is $3/2$ is:
 (a) $2 \times 10^{-4} \text{ sec}$
 (b) $2 \times 10^8 \text{ sec}$
 (c) $2 \times 10^{-11} \text{ sec}$
 (d) $2 \times 10^{11} \text{ sec}$
- Q29. A body is located on a wall. Its image of equal size is to be obtained on a parallel wall with the help of a convex lens. The lens is placed at a distance 'd' ahead of second wall, then the required focal length will be:
 (a) only $d/4$
 (b) only $d/2$
 (c) more than $d/4$ but less than $d/2$
 (d) less than $d/4$
- Q30. A thin prism of angle 15° made of glass of refractive index $\mu_1 = 1.5$ is combined with another prism of glass of refractive index $\mu_2 = 1.75$. The combination of the prism produces dispersion without deviation. The angle of the second prism should be:
 (a) 7° (b) 10°
 (c) 12° (d) 5°
- Q31. The internal energy change in a system that has absorbed 2 kcal of heat and done 500 J of work is:
 (a) 6400 J (b) 5400 J
 (c) 7900 J (d) 8900 J
- Q32. If ΔU and ΔW represent the increase in internal energy and work done by the system respectively in a thermodynamical process, which of the following is true?
 (a) $\Delta U = -\Delta W$, in an adiabatic process
 (b) $\Delta U = \Delta W$, in an isothermal process
 (c) $\Delta U = \Delta W$, in an adiabatic process
 (d) $\Delta U = -\Delta W$, in an isothermal process
- Q33. A polyatomic gas with n degrees of freedom has a mean energy per molecule given by:
 (a) nkT/N (b) $nkT/2N$
 (c) $nkT/2$ (d) $3kT/2$
- Q34. The equation of state for 5 g of oxygen at a pressure P and temperature T , when occupying a volume V , will be: (where R is the gas constant.)
 (a) $PV = (5/16) RT$
 (b) $PV = (5/32) RT$
 (c) $PV = 5 RT$
 (d) $PV = (5/2) RT$
- Q35. The angular velocity and the amplitude of a simple pendulum is ω and a respectively. At a displacement x from the mean position if its kinetic energy is T and potential energy is V , then the ratio of T to V is:
 (a) $(a^2 - x^2\omega^2) / x^2\omega^2$
 (b) $x^2\omega^2 / (a^2 - x^2\omega^2)$
 (c) $(a^2 - x^2) / x^2$
 (d) $x^2 / (a^2 - x^2)$
- Q36. A body is executing S.H.M. When the displacements from the mean position are 4cm and 5 cm, the corresponding velocities of the body are 10 cm per sec and 8 cm per sec. Then the time period of the body is:
 (a) $2\pi \text{ sec}$
 (b) $\pi/2 \text{ sec}$
 (c) $\pi \text{ sec}$
 (d) $(3\pi/2) \text{ sec}$
- Q37. A closed organ pipe (closed at one end) is excited to support the third overtone. It is found that air in the pipe has
 (a) three nodes and three antinodes
 (b) three nodes and four antinodes
 (c) four nodes and three antinodes
 (d) four nodes and four antinodes
- Q38. A source of sound gives 5 beats per second, when sounded with another source of frequency 100/sec. The second harmonic of the source, together with a source of frequency 205/sec gives 5 beats per second. What is the frequency of the source?
 (a) 95 sec^{-1} (b) 100 sec^{-1}
 (c) 105 sec^{-1} (d) 205 sec^{-1}
- Q39. Two metallic spheres of radii 1 cm and 3 cm are given charges of $-1 \times 10^{-2} \text{ C}$ and $5 \times 10^{-2} \text{ C}$, respectively. If these are connected by a conducting wire, the final charge on the bigger sphere is:
 (a) $2 \times 10^{-2} \text{ C}$
 (b) $3 \times 10^{-2} \text{ C}$
 (c) $4 \times 10^{-2} \text{ C}$
 (d) $1 \times 10^{-2} \text{ C}$

- Q40. A point charge $+q$ is placed at mid point of a cube of side 'L'. The electric flux emerging from the cube is:
 (a) q/ϵ_0 (b) $6qL^2/\epsilon_0$
 (c) $q/6L^2\epsilon_0$ (d) zero
- Q41. Three capacitors each of capacitance C and of breakdown voltage V are joined in series. The capacitance and breakdown voltage of the combination will be:
 (a) $3C, V/3$ (b) $C/3, 3V$
 (c) $3C, 3V$ (d) $CV/3, 3$
- Q42. The potential energy of particle in a force field is $U = A - B/r^2$, where A and B are positive constants and r is the distance of particle from the centre of the field. For stable equilibrium, the distance of the particle is:
 (a) $B/2A$ (b) $2A/B$
 (c) A/B (d) B/A
- Q43. In a Wheatstone's bridge all the four arms have equal resistance R . If the resistance of the galvanometer arm is also R , the equivalent resistance of the combination as seen by the battery is:
 (a) $2R$ (b) $R/4$
 (c) $R/2$ (d) R
- Q44. A wire has a resistance of 3.1Ω at 30°C and a resistance 4.5Ω at 100°C . The temperature coefficient of resistance of the wire is:
 (a) $0.0064^\circ\text{C}^{-1}$ (b) $0.0034^\circ\text{C}^{-1}$
 (c) $0.0025^\circ\text{C}^{-1}$ (d) $0.0012^\circ\text{C}^{-1}$
- Q45. Two identical batteries each of e.m.f $2V$ and internal resistance 1Ω are available to produce heat in an external resistance by passing a current through it. The maximum power that can be developed across R using these batteries is:
 (a) 3.2 W (b) 2.0 W
 (c) 1.28 W (d) $8/9\text{ W}$
- Q46. The velocity v of a particle at time t is given by $v = at + b/t + c$ where a , b , and c are constants. The dimensions of a , b , and c are respectively:
 (a) L^2, T and LT^2 (b) LT^2, LT and L
 (c) L, LT and T^2 (d) LT^{-2}, L and T
- Q47. If the error in the measurement of radius of a sphere is 2% , then the error in the determination of volume of the sphere will be:
 (a) 4% (b) 6%
 (c) 8% (d) 2%
- Q48. A car moving with a speed of 40 km/h can be stopped by applying brakes at least after 2 m . If the same car is moving with a speed of 80 km/h , what is the minimum stopping distance?
 (a) 8m (b) 6m
 (c) 4m (d) 2m
- Q49. A boat is sent across a river with a velocity of 8 km h^{-1} . If the resultant velocity of boat is 10 km h^{-1} , then the velocity of the river is:
 (a) 12.8 km h^{-1} (b) 6 km h^{-1}
 (c) 8 km h^{-1} (d) 10 km h^{-1}
- Q50. The maximum range of a gun on horizontal terrain is 16 km . If $g = 10\text{ ms}^{-2}$, then muzzle velocity of a shell must be:
 (a) 160 ms^{-1} (b) $200\sqrt{2}\text{ ms}^{-1}$
 (c) 400 ms^{-1} (d) 800 ms^{-1}
- Q51. A 100 N force acts horizontally on a block of 10 kg placed on a horizontal rough surface of coefficient of friction $\mu = 0.5$. If the acceleration due to gravity (g) is taken as 10 ms^{-2} , the acceleration of the block (in ms^{-2}) is:
 (a) 2.5 (b) 10
 (c) 5 (d) 7.5
- Q52. A bullet is fired from a gun. The force on the bullet is given by $F = 600 - 2 \times 10^5 t$ where, F is in newton and t in second. The force on the bullet becomes zero as soon as it leaves the barrel. What is the average impulse imparted to the bullet?
 (a) 1.8 Ns (b) zero
 (c) 9 Ns (d) 0.9 Ns
- Q53. A force of 250 N is required to lift a 75 kg mass through a pulley system. In order to lift the mass through 3 m , the rope has to be pulled through 12m . The efficiency of system is:
 (a) 50% (b) 75%
 (c) 33% (d) 90%
- Q54. A particle of mass m_1 is moving with a velocity v_1 and another particle of mass m_2 is moving with a velocity v_2 . Both of them have the same momentum but their different kinetic energies are E_1 and E_2 respectively. If $m_1 > m_2$ then
 (a) $E_1 = E_2$
 (b) $E_1 < E_2$
 (c) $E_1/E_2 = m_1/m_2$
 (d) $E_1 > E_2$

CHEMISTRY (Q61 to Q120)

- Q55. Two bodies have their moments of inertia I and $2I$ respectively about their axis of rotation. If their kinetic energies of rotation are equal, their angular momenta will be in the ratio:
 (a) 2:1 (b) 1:2
 (c) $\sqrt{2}$:1 (d) $1:\sqrt{2}$
- Q56. The moment of inertia of a body about a given axis is 1.2 kg m^2 . Initially, the body is at rest. In order to produce a rotational kinetic energy of 1500 joule, an angular acceleration of 25 radian/sec² must be applied about that axis for a duration of
 (a) 4 seconds
 (b) 2 seconds
 (c) 8 seconds
 (d) 10 seconds
- Q57. The escape velocity of a body on the surface of the earth is 11.2 km/s. If the earth's mass increases to twice its present value and the radius of the earth becomes half, the escape velocity would become:
 (a) 44.8 km/s
 (b) 22.4 km/s
 (c) 11.2 km/s (remains unchanged)
 (d) 5.6 km/s
- Q58. The radii of circular orbits of two satellites A and B of the earth, are $4R$ and R , respectively. If the speed of satellite A is $3V$, then the speed of satellite B will be:
 (a) $3V/4$ (b) $6V$
 (c) $12V$ (d) $3V/2$
- Q59. The terminal velocity v of a small steel ball of radius r falling under gravity through a column of a viscous liquid of coefficient of viscosity η depends on mass of the ball m , acceleration due to gravity g , coefficient of viscosity η and radius r . Which of the following relations is dimensionally correct?
 (a) $v \propto mgr/\eta$
 (b) $v \propto mg\eta r$
 (c) $v \propto mg/r\eta$
 (d) $v \propto \eta mg/r$
- Q60. A large tank is filled with water to a height H . A small hole is made at the base of the tank. It takes T_1 time to decrease the height of water to H/n ($n > 1$); and it takes T_2 time to take out the rest of water. If $T_1 = T_2$, then the value of n is
 (a) 2 (b) 3
 (c) 4 (d) $2\sqrt{2}$
- Q61. When a racemic modification is separated into its constituents' enantiomers the process is known as:
 (a) Resolution (b) Racemisation
 (c) Modification (d) Epimerisation
- Q62. Which of the following way is not a method of preparation of alcohol?
 (a) Grignard reaction
 (b) Reduction of an aldehyde, ketone, or carboxylic acid with the appropriate reducing agent
 (c) Substitution reaction of hydroxide or water on the appropriate alkyl halide
 (d) Haber's process
- Q63. The oxidation of trichloromethane results in the formation of a poisonous gas called _____.
 (a) Carbon monoxide
 (b) Carbonyl chloride
 (c) Hydrogen sulphide
 (d) Phosphine
- Q64. Which of the following reactions can produce ketones?
 (a) Oxidation of primary alcohols
 (b) Dehydrogenation of primary alcohols
 (c) Dehydrogenation of tertiary alcohols
 (d) Oxidation of secondary alcohols
- Q65. Benzoyl chloride is prepared from benzoic acid by which of the following?
 (a) Cl_2 , $h\nu$ (b) SO_2 , Cl_2
 (c) SOCl_2 (d) Cl_2 , H_2O
- Q66. On heating acetamide in presence of P_2O_5 , which of the following is formed?
 (a) Ammonium acetate
 (b) Acetonitrile
 (c) NH_3
 (d) Methylamines
- Q67. Which of the following reagents on treatment with benzenamine in basic medium produces phenyl isocyanide?
 (a) CCl_4
 (b) Trichloromethane
 (c) Methylene dichloride
 (d) Hexachloroethane

- Q68. 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
- Q69. Which of the following is associated with decrease in pK_b value of amines?
 (a) Increase in acidic strength
 (b) Increase in basic strength
 (c) Better proton donation
 (d) Better electron acceptor
- Q70. The phenomenon of mutarotation is not exhibited by
 (a) (-) Fructose (b) (+) Lactose
 (c) (+) Maltose (d) (+) Sucrose
- Q71. Which of the following vitamin serves as a hormone precursor?
 (a) Vitamin C (b) Vitamin A
 (c) Vitamin K (d) Vitamin D
- Q72. The main contributors of acid rain are:
 (a) Sulphur oxides and carbon oxides
 (b) Nitrogen oxides and sulphur oxides
 (c) Carbon dioxide and carbon monoxide
 (d) Nitrogen oxides and carbon oxides
- Q73. Polymers are not classified on the basis of which of the following?
 (a) Source
 (b) Number of monomers
 (c) Method of preparation
 (d) Structure
- Q74. Which of the following kind of polyethylene has the highest degree of chain-branching?
 (a) LDPE (b) HDPE
 (c) LLDPE (d) Cannot be determined
- Q75. Biodegradation will be more for:
 (a) More molecular weights and high crystallinity
 (b) Low molecular weights and high crystallinity
 (c) More molecular weights and less crystallinity
 (d) Low molecular weights and less crystallinity
- Q76. The flame of caesium is in the colour _____
 (a) White (b) Red Violet
 (c) Yellow (d) Blue
- Q77. The order of acidic strength of boron trihalides is:
 (a) $\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3 < \text{BI}_3$
 (b) $\text{BI}_3 < \text{BBr}_3 < \text{BCl}_3 < \text{BF}_3$
 (c) $\text{BBr}_3 < \text{BCl}_3 < \text{BF}_3 < \text{BI}_3$
 (d) $\text{BF}_3 < \text{BI}_3 < \text{BCl}_3 < \text{BBr}_3$
- Q78. Which oxoacid of sulphur is commonly used for disinfecting swimming pools as well as delignification of wood?
 (a) Sulfuric acid
 (b) Peroxydisulfuric acid
 (c) Sulfoxylic acid
 (d) Peroxymonosulfuric acid
- Q79. Which of the following is the correct order of oxidizing power of perhalates?
 (a) $\text{BrO}_4^- < \text{IO}_4^- < \text{ClO}_4^-$
 (b) $\text{IO}_4^- > \text{BrO}_4^- > \text{ClO}_4^-$
 (c) $\text{IO}_4^- < \text{BrO}_4^- < \text{ClO}_4^-$
 (d) $\text{BrO}_4^- > \text{IO}_4^- > \text{ClO}_4^-$
- Q80. What is the correct order of magnetic strength among the following elements?
 (a) $\text{Fe} > \text{Co} > \text{Ni} > \text{Cu}$
 (b) $\text{Fe} > \text{Ni} > \text{Co} > \text{Cu}$
 (c) $\text{Cu} > \text{Ni} > \text{Co} > \text{Fe}$
 (d) $\text{Cu} > \text{Fe} > \text{Ni} > \text{Co}$
- Q81. Which of the following is an alloy of iron?
 (a) Vitallium (b) Brass
 (c) Invar (d) Solder
- Q82. Identify the correct naming for $\text{K}_2[\text{PdCl}_4]$.
 (a) Potassium tetrachlorinepalladium (II)
 (b) Potassium tetrachlorinepalladate (II)
 (c) Potassium tetrachloridopalladium (II)
 (d) Potassium tetrachloridopalladate (II)
- Q83. Identify the correct relation between Δ_o and Δ_t where Δ_o denotes crystal field splitting in octahedral complexes and Δ_t denotes crystal field splitting tetrahedral complexes.
 (a) $\Delta_o < \Delta_t$ (b) $\Delta_o > \Delta_t$
 (c) $\Delta_o = \Delta_t$ (d) $\Delta_o \geq \Delta_t$

- Q84. How many geometrical isomers are possible in a complex of type $[MA_2(D)_2]$, where A is unidentate and D is bidentate?
 (a) 0 (b) 2
 (c) 3 (d) 4
- Q85. Haemoglobin is a complex compound of which metal ion?
 (a) Fe^{2+} (b) Fe^{3+}
 (c) Co^{2+} (d) Co^{3+}
- Q86. Which of the following is known as Baker-Nathan effect?
 (a) Mesomeric effect (b) Inductive effect
 (c) Hyperconjugation (d) Electromeric effect
- Q87. The geometry of carbanion is _____
 (a) Pyramidal (b) Linear
 (c) Tetrahedral (d) Trigonal planar
- Q88. According to Huckel's rule an aromatic compound must possess
 (a) $(4n+1)\pi$ -electrons
 (b) $(4n+2)\pi$ -electrons
 (c) $4n\pi$ -electrons
 (d) $(4n+3)\pi$ -elements
- Q89. Which of the following is not a type of structural isomerism?
 (a) Geometric isomerism
 (b) Chain isomerism
 (c) Metamerism
 (d) Tautomerism
- Q90. The dihedral angle of the least stable conformation of ethane is:
 (a) 0° (b) 60°
 (c) 109.5° (d) 120°
- Q91. What is the number of electrons transferred in an equation if the Nernst equation is $E_{(cell)} = E^\circ_{(cell)} - 9.83 \times 10^{-3} \times \log_{10}$ (Anode/Cathode)?
 (a) 2 (b) 6
 (c) 4 (d) 1
- Q92. The Gibbs free energy is positive when a change in enthalpy and change in entropy are positive at:
 (a) High temperatures
 (b) Low temperatures
 (c) All temperatures
 (d) Only at 0 Kelvin
- Q93. Which of the given solutions have an equal value of molar conductivity and equivalent conductivity?
 (a) 1M $BaSO_4$ (b) 1M KCl
 (c) 1M BCl_3 (d) 1M $CaSO_4$
- Q94. According to the Dalton's law of partial pressures, the total pressure of a mixture of ideal gases is equal to the:
 (a) Different of the highest and lowest pressure
 (b) Product of the partial pressures
 (c) Sum of the partial pressure
 (d) None of the mentioned
- Q95. What is the constant in ideal gas equation known as?
 (a) Universal gas constant
 (b) Pressure constant
 (c) Temperature constant
 (d) Boltzmann constant
- Q96. When there are no external forces, the shape of a liquid drop is determined by:
 (a) Surface Tension of the liquid
 (b) The density of the liquid
 (c) The viscosity of the liquid
 (d) The temperature of air only
- Q97. In which type of point defect are the cations and anions absent in stoichiometric proportions?
 (a) Schottky defect
 (b) Frenkel defect
 (c) Impurity defect
 (d) The given situation does not occur for any point defect.
- Q98. Mention the Freundlich adsorption isotherm:
 (a) $x/m = Kp^n$ (b) $x/m = Kp^{n^2}$
 (c) $x/m = Kp^{1/n}$ (d) $x/m = pK$
- Q99. Which one of the following will act as best protective colloid?
 (a) Starch (Gold No. 25)
 (b) Gelatin (Gold No. 0.005)
 (c) Gum arabic (Gold No. 0.15)
 (d) Egg albumin (Gold No. 0.08)
- Q100. The correct order of electronegativity is
 (a) $Cl > F > O > Br$ (b) $F > O > Cl > Br$
 (c) $F > Cl > Br > O$ (d) $O > F > Cl > Br$

- Q101. What is the correct order of electronegativity among the following options?
 (a) $\text{Li} < \text{Na} < \text{K} < \text{Rb} < \text{Cs}$
 (b) $\text{Li} < \text{K} < \text{Na} < \text{Rb} < \text{Cs}$
 (c) $\text{Li} > \text{N} > \text{K} > \text{Cs} > \text{Rb}$
 (d) $\text{Li} > \text{Na} > \text{K} = \text{Rb} > \text{Cs}$
- Q102. All the _____ species (molecules and ions) have the same bond order.
 (a) Isotopic (b) Isoelectronic
 (c) Isobaric (d) Isoneutronic
- Q103. The maximum number of 90° angles between bond pair of electrons is observed in
 (a) dsp^2 hybridisation
 (b) sp^3d hybridisation
 (c) sp^3d^2 hybridisation
 (d) sp^3d^2 hybridisation
- Q104. What is the shape of the molecule NH_3 ?
 (a) Square pyramidal
 (b) V-shape
 (c) Triagonal pyramidal
 (d) Tetrahedral
- Q105. Arrange the following molecules in decreasing bond length.
 (a) $\text{O}_2 > \text{O}_2^- > \text{O}_2^+ > \text{O}_2^{2-}$
 (b) $\text{O}_2^{2-} > \text{O}_2^- > \text{O}_2 > \text{O}_2^+$
 (c) $\text{O}_2^{2-} > \text{O}_2^- > \text{O}_2^+ > \text{O}_2$
 (d) $\text{O}_2^- > \text{O}_2^+ > \text{O}_2^{2-} > \text{O}_2$
- Q106. 2.044×10^{23} atoms of oxygen contains
 (a) 1 mole of oxygen (b) 2 moles of oxygen
 (c) 3 moles of oxygen (d) 4 moles of oxygen
- Q107. What is the implication of Pauli's exclusion principle?
 (a) Electrons must have at least one different quantum number to reside in the same orbital
 (b) Electrons must have the same quantum numbers to reside in the same orbital
 (c) Electrons are particles rather than clouds and their location is deterministic
 (d) Different electrons have the same spin and spatial wave function as they are indistinguishable
- Q108. Identify the de-Broglie expression from the following.
 (a) $\lambda = h \times p$ (b) $\lambda = hp$
 (c) $\lambda = h+p$ (d) $\lambda = h-p$
- Q109. Le-Chatelier's principle is applicable to:
 (a) Heterogenous reaction
 (b) Homogenous reaction
 (c) Irreversible reaction
 (d) System in equilibrium
- Q110. Ostwald's dilution law is applicable to:
 (a) Strong electrolytes only
 (b) Weak electrolytes only
 (c) Non-electrolytes
 (d) Strong as well as weak electrolytes
- Q111. Lewis concept does explain the behaviour of:
 (a) Bases
 (b) Salts
 (c) Protonic acids
 (d) Amphoteric substances
- Q112. Buffer solutions resist any change in pH. This is because:
 (a) Acids and alkalis in these solutions are shielded from attack by other ions
 (b) These give unionised acid or base on reaction with acid or alkali
 (c) Fixed value of pH
 (d) Large excess of H^+ or OH^- ions
- Q113. Molecularity of a reaction is equal to the total number of:
 (a) Products formed in the elementary step
 (b) Reactants taking part in elementary step
 (c) Reactants and products in the elementary step
 (d) Reactants and products in the final step
- Q114. Which of the following is correct based on Arrhenius model of the rate constant $K = Ae^{-E/RT}$?
 (a) A is always dimensionless
 (b) For two reactions 1 and 2, if $A_1 = A_2$ and $E_1 > E_2$, then $K_1(T) > K_2(T)$
 (c) For a given reaction, the percentage change of k with respect to temperature is higher at lower temperatures
 (d) The percentage change of K with respect to temperature is higher for higher A

Q115. Which of the following statements regarding Ideal solutions is false?

- (a) Ideal solutions obey Raoult's law under all conditions of temperature and concentrations
- (b) There will be some change in volume on mixing the components, i.e., $\Delta V_{\text{mixing}} \neq 0$
- (c) There will be no change in enthalpy when the two components are mixed, i.e., $\Delta H_{\text{mixing}} = 0$
- (d) There will be no change in volume on mixing the components, i.e., $\Delta V_{\text{mixing}} = 0$

Q116. In which of the following solutions will the Van't Hoff Factor for the solute be lesser than 1?

- (a) Sodium chloride in water
- (b) benzoic acid in benzene
- (c) Acetic acid in benzene
- (d) Phenol in benzene

Q117. Which one is true for internal energy?

- (a) It is sum of all forms of energies associated with molecules of a system
- (b) It is a state function of a system
- (c) It is proportional to transnational K.E of the molecules
- (d) All of the mentioned

Q118. The enthalpy change in the reaction, $2\text{CO} + \text{O}_2 \rightarrow 2\text{CO}_2$ is termed as:

- (a) Enthalpy of reaction
- (b) Enthalpy of fusion
- (c) Enthalpy of formation
- (d) Enthalpy of combustion

Q119. Hess's law states that a chemical reaction is independent of the route by which chemical reactions take place while keeping the same:

- (a) Initial conditions only
- (b) Final conditions only
- (c) Mid-conditions
- (d) Initial and final conditions

Q120. Spontaneous reaction that occur are mostly _____ in nature.

- (a) Endothermic
- (b) Exothermic
- (c) Both endothermic and exothermic
- (d) Neither exothermic nor endothermic

BIOLOGY (Q121 to Q180)

Q121. This statement about enzymes is true
 (a) enzymes accelerate reactions by lowering the activation energy
 (b) enzymes are proteins whose three-dimensional form is key to their function
 (c) enzymes do not alter the overall change in free energy for a reaction
 (d) all of these

Q122. Name the site where digestion of proteins occurs.

- (a) Pancreas
- (b) Rectum
- (c) Liver
- (d) Ileum

Q123. Stomach epithelial cells in the body secrete

- (a) Hydrochloric acid
- (b) Oxytocin
- (c) Adrenaline
- (d) Testosterone

Q124. Night blindness and xerophthalmia are generally conditions associated with the deficiency of which vitamin?

- (a) Vitamin B
- (b) Vitamin K
- (c) Vitamin B2
- (d) Vitamin A

Q125. _____ are functional units of food absorption.

- (a) Red blood cells
- (b) Small intestine
- (c) Villi
- (d) Aggregated lymphoid nodules

Q126. Where are the parotid glands located?

- (a) Below the stomach
- (b) Behind and above the pancreas
- (c) Below and in front of the ear canal
- (d) Underneath the armpits

Q127. The maximum amount of carbon dioxide in the human body is transported as:

- (a) Bicarbonate
- (b) Carbide
- (c) Amylase
- (d) None of the above

Q128. Which of the following organisms have book lungs?

- (a) Spider
- (b) Ant
- (c) Penguin
- (d) Sealion

Q129. Altitude sickness is typically caused due to:

- (a) The partial pressure of oxygen
- (b) Increased levels of CO_2 in blood
- (c) Cold temperatures
- (d) None of the above

- Q130. Hypopnea is a condition where:
 (a) The airway becomes partially obstructed
 (b) The blood does not clot properly
 (c) The lungs cannot eliminate the excess carbon dioxide from the body
 (d) The blood oxygen levels are abnormally low
- Q131. Emphysema is characterized by:
 (a) Loss of peripheral vision
 (b) Shortness of breath
 (c) Chronic Diarrhea
 (d) Slow clotting from wounds
- Q132. _____ is a lytic enzyme released by the sperm.
 (a) Hyaluronidase (b) Trypsin
 (c) Helicase (d) None of the above
- Q133. Which of the following is not used as a biopesticide?
 (a) *Xanthomonas campestris*
 (b) *Bacillus thuringiensis*
 (c) *Trichoderma harzianum*
 (d) Nuclear Polyhedrosis Virus
- Q134. The inserted normal gene takes over the function of _____ gene.
 (a) correct (b) right
 (c) non-functional (d) functional
- Q135. Umbilical cord contains _____
 (a) Pluripotent stem cells
 (b) Cord blood stem cells
 (c) Blood stem cells
 (d) None of the above
- Q136. Plants growing under shade are known as
 (a) Psamophytes (b) Sciophytes
 (c) Heliophytes (d) Monocots
- Q137. Which is not the characteristic of 'r' selected species?
 (a) Reproduce quickly
 (b) Parental care
 (c) A low survival rate of progenies
 (d) Produce a large number of progenies
- Q138. High biological oxygen demand in a water body means _____
 (a) Water is not polluted
 (b) Water is polluted
 (c) Waterbody contains lots of lifeforms
 (d) None of the above
- Q139. Which of the following is used as a substrate for alcohol fermentation?
 (a) Maize
 (b) Barley
 (c) Sucrose
 (d) None of the above
- Q140. Antibiotics are the most effective on:
 (a) Bacteria (b) Virus
 (c) Fungi (d) None of the above
- Q141. *Bacillus thuringiensis* is widely used as:
 (a) Insecticide (b) Weedicides
 (c) Rodenticide (d) None of the above
- Q142. Which of the following is not a characteristic of the phylum Arthropoda?
 (a) Metameric segmentation
 (b) Jointed appendages
 (c) Chitinous exoskeleton
 (d) Parapodia
- Q143. Excretion is performed by _____ in flatworms.
 (a) protonephridia (b) flame cells
 (c) green glands (d) malpighian tubules
- Q144. In connective tissue sheaths, this is the correct sequence stretching from the outermost to the innermost layer
 (a) epineurium, endoneurium, perineurium
 (b) perineurium, epineurium, endoneurium
 (c) perineurium, endoneurium, epineurium
 (d) epineurium, perineurium, endoneurium
- Q145. This is correct about epithelial tissue
 (a) lack of nerve supply
 (b) lack of blood supply
 (c) lack of free surface
 (d) lack of intercellular matrix
- Q146. The organelle serving as a primary packaging area for molecules that will be distributed throughout the cell is
 (a) Vacuole (b) Plastids
 (c) Mitochondria (d) Golgi apparatus
- Q147. Animal cells are interconnected by
 (a) Plasma membrane
 (b) Cell wall
 (c) Desmosomes
 (d) Plasmodesmata
- Q148. The Cell theory is not applicable to
 (a) Fungi (b) Algae
 (c) Virus (d) Microbes

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| Q149. This tissue includes the blood tissue
(a) Muscle tissue
(b) Connective tissue
(c) Epithelial tissue
(d) Nervous tissue | Q159. An exception to Mendel's law is
(a) Independent assortment
(b) Linkage
(c) Dominance
(d) Purity of gametes |
| Q150. Which of the following is known as mitoplast?
(a) Mitochondria without outer membrane
(b) Another name for mitochondria
(c) Mitochondria without membranes
(d) Mitochondria without inner membrane | Q160. Pea plants were used in Mendel's experiments because
(a) They were cheap
(b) They had contrasting characters
(c) They were available easily
(d) All of the above |
| Q151. What is the function of the filiform apparatus?
(a) Guide the entry of pollen tube
(b) Recognize the suitable pollen at the stigma
(c) Produce nectar
(d) Stimulate division of the generative cell | Q161. The smallest unit of genetic material which produces a phenotypic effect on mutation is
(a) Muton
(b) Gene
(c) Recon
(d) Nucleic acid |
| Q152. The tendency of an offspring to resemble its parent is known as
(a) Variation
(b) Heredity
(c) Resemblance
(d) Inheritance | Q162. The natural place of an organism or community is known as
(a) Niche
(b) Biome
(c) Habitat
(d) Habit |
| Q153. Who is known as the "Father of Genetics"?
(a) Morgan
(b) Mendel
(c) Watson
(d) Bateson | Q163. Which is the renewable exhaustible natural energy resource?
(a) Coal
(b) Petroleum
(c) Kerosene
(d) Biomass |
| Q154. The alternate form of a gene is
(a) Alternate type
(b) Recessive character
(c) Dominant character
(d) Allele | Q164. According to Shelford's Law of Tolerance, the organisms wide environmental factor tolerance limit show
(a) Narrow distribution with low population size
(b) Wide distribution with high population size
(c) Narrow distribution with high population size
(d) Wide distribution with low population size |
| Q155. The genotypic ratio of a monohybrid cross is
(a) 1:2:1
(b) 3:1
(c) 2:1:1
(d) 9:3:3:1 | Q165. Plants growing under direct sunlight are known as
(a) Heliophytes
(b) Sciophytes
(c) Psamophytes
(d) Dicots |
| Q156. The crossing of F1 to either of the parents is known as
(a) Test cross
(b) Back cross
(c) F1 cross
(d) All of the above | Q166. Which of the following plants is an example of a cryptogam with vascular tissues?
(a) Equisetum
(b) Cedrus
(c) Marchantia
(d) Ginkgo |
| Q157. Which of the following statements is true regarding the "law of segregation"?
(a) Law of segregation is the law of purity of genes
(b) Alleles separate from each other during gametogenesis
(c) Segregation of factors is due to the segregation of chromosomes during meiosis
(d) All of the above | Q167. Which of the following plants does not have independent and free-living male and female gametophytes?
(a) Funaria
(b) Pteris
(c) Cedrus
(d) Polytrichum |
| Q158. Homozygosity and heterozygosity of an individual can be determined by
(a) Back cross
(b) Self-fertilization
(c) Test cross
(d) All of the above | |

- Q168. Why is grafting not possible in monocots?
 (a) Because they are herbaceous
 (b) Because they lack cambium
 (c) Because they do not have venation
 (d) Because they have parallel venation
- Q169. In the rainy season, doors get swelled up due to
 (a) Transpiration (b) Imbibition
 (c) Diffusion (d) Respiration
- Q170. Melanoma is a type of cancer that develops from _____.
 (a) Granulocytes
 (b) Melanocytes
 (c) Adipocyte
 (d) None of the above
- Q171. Human Immunodeficiency Virus causes aids by attacking a type of white blood cell called _____.
 (a) CD4 (b) CD3
 (c) CD8 (d) None of the above
- Q172. This statement regarding enzyme inhibition is correct
 (a) non-competitive inhibitors often bind to the enzyme irreversibly
 (b) non-competitive inhibition of an enzyme can be overcome by adding a large amount of substrate
 (c) competitive inhibition is observed when substrate and inhibitor compete for the active site on enzyme
 (d) competitive inhibition is observed when substrate competes with an enzyme to bind to an inhibitor protein
- Q173. Macromolecule chitin is
 (a) phosphorous containing polysaccharide
 (b) nitrogen containing polysaccharide
 (c) sulphur containing polysaccharide
 (d) simple polysaccharide
- Q174. Generative nucleus divides forming
 (a) 2 male nuclei (b) 3 male nuclei
 (c) 2 female nuclei (d) 3 female nuclei
- Q175. One nucleus of the pollen tube and secondary nucleus of the ovum grow into
 (a) Stigma (b) Endosperm
 (c) Anther (d) Stamen
- Q176. The stalk of Datura flower at its base is known as
 (a) Pedicel (b) Corolla
 (c) Sepals (d) Thalamus
- Q177. The male reproductive parts of a flower, the stamens, are collectively known as
 (a) Androecium (b) Filament
 (c) Anther (d) Gynoecium
- Q178. The other name for gynoecium is
 (a) Pistil (b) Stigma
 (c) Androecium (d) Style
- Q179. Functional megaspore in a flowering plant develops into
 (a) Endosperm (b) Ovule
 (c) Embryo-sac (d) Embryo
- Q180. Which of the following is similar to autogamy, but requires pollinators?
 (a) Geitonogamy (b) Cleistogamy
 (c) Apogamy (d) Xenogamy

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