FULL TEST-01
MHT-CET
Subjects : Physics & Chemistry

Question Booklet Version	MH-CET - 2024 Roll No.	Question Booklet Sr. No.
11 (Write this number on your Answer Sheet)		**A050123**
	Answer Sheet No.	(Write this number on your Answer Sheet)

Day and Date :

Duration : 90 minutes

Total Marks : 100

This is to certify that, the entries of MH-CET Roll No. and Answer Sheet No. have been correctly written and verified.

Candidate's Signature   Invigilator's Signature

Instructions to Candidates

1. This question booklet contains 100 Objective Type Question (Multiple Choice Questions (MCQ)) of Physics (50) & Chemistry (50).
2. This question paper and OMR (Optical Mark Reader) Answer Sheet is issued separately at the start of the examination.
3. Choice and sequence for attempting questions will be as per the convenience of the candidate.
4. Candidate should carefully read the instructions printed on the Question Booklet and Answer Sheet and make the correct entries on the Answer Sheet. As Answer Sheets are designed to suit the OPTICAL MARK READER (OMR) SYSTEM , special care should be taken to mark the entries correctly. Special care should be taken to fill QUESTION BOOKLET VERSION, SERIAL No. and MH-CET Roll No. accurately. The correctness of entries has to be cross-checked by the invigilators. **The candidate must sign on the Answer Sheet and Question Booklet**
5. Read each question carefully
6. Determine the one correct answer from out of the four available options given for each question.
7. Fill the appropriate circle completely like this ●, for answering a particular question. Mark with Black ink ball point pen only.
8. **Each question with correct response shall be awarded one (1) mark. There shall be no negative marking. No mark shall be granted for marking two or more answers of same question, scratching or overwriting.**
9. Use of whitener or any other material to erase/hide the circle once filled is not permitted.
10. Avoid overwriting and/or striking of answer once marked.
11. Rough work should be done only on the blank space provided on the Question Booklet. **Rough work should not be done on the Answer Sheet.**
12. Immediately after the prescribed examination time is over, the Question Booklet and Answer sheet is to be returned to the Invigilator. Confirm that both the Candidate and invigilator have signed on question booklet and answer sheet
13. No candidate is allowed to leave the examination hall till the end of examination.

PHYSICS

Q.1   In an unbiased p - n junction electrons diffuse from n-region to p-region because
(A) holes in p-region attract them
(B) electrons travel across the junction due to potential difference
(C) electron concentration in n-region is more as compared to that in p-region
(D) only electrons move from n to p region and not the vice-versa.

Q.2   Two cars of masses m_1 and m_2 are moving in circles of radii r_1 and r_2 respectively. Their speeds are such that they make complete circles in the same time t. The ratio of their centripetal acceleration is :
(A) $m_1 r_1 : m_2 r_2$ (B) $m_1 : m_2$ (C) $r_1 : r_2$ (D) 1 : 1

Q.3   The logic gate equivalent to the given logic circuit is

(A) OR   (B) AND   (C) NOR   (D) NAND

Q.4   In a Young's double slit experiment the intensity at a point where the path difference is $\dfrac{\lambda}{6}$ (λ being the wavelength of the light used) is I. If I_0 denotes the maximum intensity, I/I_0 is equal to:

(A) $\dfrac{1}{\sqrt{2}}$

        (B) $\dfrac{\sqrt{3}}{2}$ (C) $\dfrac{1}{2}$ (D) $\dfrac{3}{4}$

Q.5   At what temperature is the r.m.s. velocity of a hydrogen molecule equal to that of an oxygen molecule at 47°C ?
(A) 80 K   (B) –73 K   (C) 3 K   (D) 20 K

Q.6   The height at which the acceleration due to gravity becomes $\dfrac{g}{9}$ (where g = the acceleration due to gravity on the surface of the earth) in terms of R, the radius of the earth, is

(A) $\dfrac{R}{\sqrt{2}}$ (B) $\dfrac{R}{2}$ (C) $\sqrt{2}$ R   (D) 2R

SPACE FOR ROUGH WORK

Q.7 A fluid is flowing through a horizontal pipe of varying cross-section, with speed $v\ ms^{-1}$ at a point where the pressure is P pascal. At another point where pressure is $\dfrac{P}{2}$ pascal its speed is $V\ ms^{-1}$. If the density of the fluid is $\rho\ kg\ m^{-3}$ and the flow is streamline, then V is equal to :

(A) $\sqrt{\dfrac{P}{\rho}+v^2}$ 　　 (B) $\sqrt{\dfrac{2P}{\rho}+v^2}$ 　　 (C) $\sqrt{\dfrac{P}{\rho}+v}$ 　　 (D) $\sqrt{\dfrac{P}{2\rho}+v^2}$

Q.8 Aresistance of $40\ \Omega$ is connected to a source of alternating current rated 220 V, 50 Hz. Find the time taken by the current to change from its maximum value to rms value
(A) 2.5 ms 　　　(B) 1.25 ms 　　　(C) 2.5 s 　　　(D) 0.25 s

Q.9 Two points P and Q are maintained at the potentials of 10 V and –4 V respectively. The work done in moving 100 electrons from P to Q is :
(A) 9.60×10^{-17} J 　(B) -2.24×10^{-16} J 　(C) 2.24×10^{-16} J 　(D) -9.60×10^{-17} J

Q.10 Aparticle of mass m is attached to a spring (of spring constant k) and has a natural angular frequency ω_0. An external force F(t) proportional to $\cos\omega t\ (\omega \neq \omega_0)$ is applied to the oscillator. The time displacement of the oscillator will be proportional to

(A) $\dfrac{m}{\omega_0^2 - \omega^2}$ 　　 (B) $\dfrac{1}{m(\omega_0^2 - \omega^2)}$ 　　 (C) $\dfrac{1}{m(\omega_0^2 + \omega^2)}$ 　　 (D) $\dfrac{1}{\omega_0^2 + \omega^2}$

Q.11 Acoil has an inductance of 2 H and resistance of 4Ω. A 10 V is applied across the coil. The energy stored in the magnetic field after the current has built up to its equilibrium value will be
(A) 6.25 J 　　　(B) 62.5 J 　　　(C) 625 J 　　　(D) 0.625 J

Q.12 Two masses $m_1= 5\ kg$ and $m_2= 4.8\ kg$ tied to a string are hanging over a light frictionless pulley. What is the acceleration of the masses when system is free to move? ($g = 9.8\ m/s^2$)
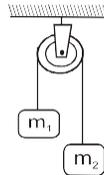
(A) $0.2\ m/s^2$ 　　　(B) $9.8\ m/s^2$ 　　　(C) $5\ m/s^2$ 　　　(D) $4.8\ m/s^2$

Q.13 The ratio for the speed of the electron in the 3rd orbit of He^+ to the speed of the electron in the 3rd orbit of hydrogen atom will be :-
(A) 1 : 1 　　　(B) 1 : 2 　　　(C) 4 : 1 　　　(D) 2 : 1

SPACE FOR ROUGH WORK

Q.14 There are four convex lenses L_1, L_2, L_3 and L_4 of focal length 2, 4, 6 and 8 cm, respectively. Two of these lenses from a telescope of length 10 cm and magnifying power 4. The objective and eye lenses are respectively

(A) L_1, L_2 (B) L_1, L_4 (C) L_2, L_3 (D) L_4, L_1

Q.15 A simple harmonic motion is represented by : $y = 5\left(\sin 3\pi t + \sqrt{3} \cos 3\pi t \right) cm$. The amplitude and time period of the motion are :

(A) 10 cm, $\dfrac{2}{3}$ s   (B) 10 cm, $\dfrac{3}{2}$ s   (C) 5 cm, $\dfrac{3}{2}$ s   (D) 5 cm, $\dfrac{2}{3}$ s

Q.16 Two spherical soap bubbles of radii r_1 and r_2 in vacuum combine under isothermal conditions. The resulting bubble has a radius equal to :

(A) $\dfrac{r_1 r_2}{r_1 + r_2}$ (B) $\sqrt{r_1 r_2}$ (C) $\sqrt{r_1^2 + r_2^2}$ (D) $\dfrac{r_1 + r_2}{2}$

Q.17 A Thick wire in the form of a semicircle of radius 'r' is rotated with a frequency 'f' in a magnetic field. What will be the peak value of emf induced ?

(A) $B \pi r^2 f$ (B) $B \pi^2 r^2 f$ (C) $2 B r^2 f$ (D) $2 B \pi^2 r^2 f$

Q.18 A rubber ball filled with water, having a small hole at the bottom of the ball, is used as the bob of a simple pendulum. The time period of such a pendulum

(A) is a constant

(B) decreases with time

(C) increases with time

(D) first increases and then decreases finally having same value as at the beginning

Q.19 When a metallic surface is illuminated with monochromatic light of wavelength λ, the stopping potential is 5 V_0. When the same surface is illuminated with light of wavelength 3λ, the stopping potential is V_0. Then the work function of the metallic surface is :

(A) $\dfrac{hc}{6\lambda}$ (B) $\dfrac{hc}{5\lambda}$ (C) $\dfrac{hc}{4\lambda}$ (D) $\dfrac{2hc}{4\lambda}$

Q.20 Magnetic field at the centre of a circular loop of area A is B. Then current in the loop will be

(A) $\dfrac{BA^2}{\mu_0 \pi}$ (B) $\dfrac{BA}{\mu_0}\sqrt{A}$ (C) $\dfrac{BA\sqrt{A}}{\mu_0 \pi}$ (D) $\dfrac{2B}{\mu_0}\sqrt{\dfrac{A}{\pi}}$

SPACE FOR ROUGH WORK

**Q.21** The given diagram shows four processes i.e., isochoric, isobaric, isothermal and adiabatic. The correct assignment of the processes, in the same order is given by :-
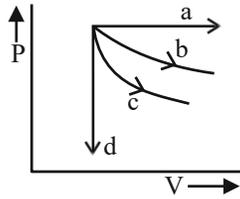
(A) d a c b   (B) a d c b   (C) a d b c   (D) d a b c

Q.22 Consider a galvanometer shunted with 5Ω resistance and 2% of current passes through it. What is the resistance of the given galvanometer?

(A) 300 Ω   (B) 344 Ω   (C) 245 Ω   (D) 226 Ω

Q.23 In an a.c. circuit the voltage applied is $E = E_0 \sin\omega t$. The resulting current in the circuit is $I = I_0 \sin\left(\omega t - \dfrac{\pi}{2}\right)$.

The power consumption in the circuit is given by

(A) $P = \sqrt{2}E_0 I_0$ (B) $P = \dfrac{E_0 I_0}{\sqrt{2}}$ (C) $P = $ zero   (D) $P = \dfrac{E_0 I_0}{2}$

Q.24 A circular disc D_1 of mass M and radius R has two identical discs D_2 and D_3 of the same mass M and radius R attached rigidly as its opposite ends (see figure). The moment of inertia of the system about the axis OO', passing through the centre of D_1 as shown in the figure, will :
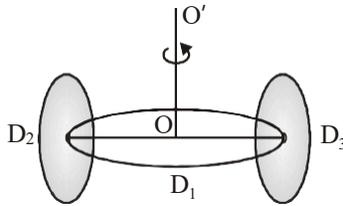
(A) MR^2 (B) $3MR^2$ (C) $\dfrac{4}{5}MR^2$ (D) $\dfrac{2}{3}MR^2$

Q.25 Two rods A and B of identical dimensions are at temperature 30°C. If A heated upto 180°C and B upto T°C, then the new lengths are the same. If the ratio of the coefficients of linear expansion of A and B is 4 : 3, then the value of T is :

(A) 230°C   (B) 270°C   (C) 200°C   (D) 250°C

SPACE FOR ROUGH WORK

Q.26 A wire under tension 144 N produces 6 beats per second when it is tuned with a fork. When the tension changes to 169 N, it is again tuned with the same tuning fork, the number of beats remain unchanged. The frequency of tuning fork will be

(A) 256 Hz   (B) 175 Hz   (C) 150 Hz   (D) 125 Hz

Q.27 Imagine that the electron in a hydrogen atom is replaced by a muon (μ). The mass of muon particle is 207 times that of an electron and charge is equal to the charge of an electron. The ionization potential of this hydrogen atom will be :-

(A) 13.6 eV   (B) 2815.2 eV   (C) 331.2 eV   (D) 27.2 eV

Q.28 Calculate the value of mean free path (λ) for oxygen molecules at temperature 27°C and pressure 1.01×10^5 Pa. Assume the molecular diameter 0.3 nm and the gas is ideal. ($k = 1.38 \times 10^{-23}$ JK^{-1})

(A) 58 nm   (B) 32 nm   (C) 86 nm   (D) 102 nm

Q.29 Three charges Q, +q and + q are placed at the vertices of a right - angle isosceles triangle as shown below. The net electrostatic potential energy of the configuration is zero, if the value of Q is :
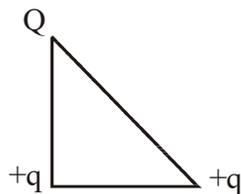

(A) +q   (B) $\dfrac{-\sqrt{2}q}{\sqrt{2}+1}$ (C) $\dfrac{-q}{1+\sqrt{2}}$ (D) $-2q$

Q.30 A sample of gas with $\gamma = 1.5$ is taken through an adiabatic process in which the volume is compressed from 1200 cm^3 to 300 cm^3. If the initial pressure is 200 kPa. The absolute value of the workdone by the gas in the process is

(A) 0.48 J   (B) 2.4 J   (C) 480 J   (D) 240 J

Q.31 In Young's double slit experiment, if the source of light changes from orange to blue then:

(A) the central bright fringe will become a dark fringe.

(B) the distance between consecutive fringes will decrease.

(C) the distance between consecutive fringes will increase.

(D) the intensity of the minima will increase.

SPACE FOR ROUGH WORK

Q.32 Water from a tap emerges vertically downwards with an initial speed of 1.0 ms^{-1}. The crosssectional area of the tap is 10^{-4}m^2. Assume that the pressure is constant throughout the stream of water and that the flow is streamlined. The cross-sectional area of the stream, 0.15 m below the tap would be :(Take $g = 10$ ms^{-2})

(A) 1×10^{-5} m^2 (B) 5×10^{-5} m^2 (C) 2×10^{-5} m^2 (D) 5×10^{-4} m^2

Q.33. In an NPN transistor 10^{10} electrons enter the emitter in 10^{-6} S and 4% electrons recombine with holes in base. The current ratios 'α' and 'β' of a transistor are respectively (nearly)

(A) 0.96, 24   (B) 24, 0.96   (C) 0.24, 96   (D) 96, 0.24

Q.34 A tuning fork of frequency f produces 6 beats per second with a tuning fork of frequency of 248 Hz and 9 beats with another tuning fork having frequency of 263 Hz. The value of f will be

(A) 257 Hz   (B) 242 Hz   (C) 254 Hz   (D) 282 Hz

Q.35 The real force 'F' acting on a particle of mass 'm' performing circular motion acts along the radius of circle 'r' and is directed towards the center of circle. The square root of magnitude of such force is (T = periodic time)

(A) $\dfrac{2\pi}{T}\sqrt{mr}$ (B) $\dfrac{Tmr}{4\pi}$ (C) $\dfrac{2\pi T}{\sqrt{mr}}$ (D) $\dfrac{T^2 mr}{4\pi}$

Q.36 In a cuboid of dimension $2L \times 2L \times L$, a charge q is placed at the centre of the surface 'S' having area of 4 L^2. The flux through the opposite surface to 'S' is given by

(A) $\dfrac{q}{12\,\epsilon_0}$ (B) $\dfrac{q}{3\epsilon_0}$ (C) $\dfrac{q}{2\,\epsilon_0}$ (D) $\dfrac{q}{6\,\epsilon_0}$

Q.37 The velocity of a moving body can be found from
(A) area under velocity - time graph.
(B) area under displacement - time graph.
(C) slope of the velocity - time graph.
(D) slope of the displacement - time graph.

Q.38 The magnetic field at the center of current carrying circular loop is B_1. The magnetic field at a distance of $\sqrt{3}$ times radius of the given circular loop from the center on its axis is B_2. The value of B_1/B_2 will be

(A) $9:4$ (B) $12 : \sqrt{15}$ (C) $8:1$ (D) $5 : \sqrt{3}$

SPACE FOR ROUGH WORK

Q.39 The maximum wavelength of radiation emitted by a star is 289.8 nm. Then intensity of radiation for the star is (Given: Stefan's constant = 5.67×10^{-8}

Wm^{-2}K^{-4}, Wien's constant, b = 2898 μmK).

(A) 5.67×10^{-12} Wm^{-2} (B) 10.67×10^{-14} Wm^{-2}

(C) 5.67×10^{8} Wm^{-2} (D) 10.67×10^{7} Wm^{-2}

Q.40 In a potentiometer experiment the balancing with a cell is at length 240 cm. On shunting the cell with a resistance of 2Ω, the balancing length becomes 120 cm. The internal resistance of the cell is :

(A) 1 Ω   (B) 0.5 Ω   (C) 4 Ω   (D) 2 Ω

Q.41 The minimum and maximum distances of a planet revolving around the Sun are x_1 and x_2. If the minimum speed of the planet on its trajectory is v_0 then its maximum speed will be :

(A) $\dfrac{v_0 x_1^2}{x_2^2}$ (B) $\dfrac{v_0 x_2^2}{x_1^2}$ (C) $\dfrac{v_0 x_1}{x_2}$ (D) $\dfrac{v_0 x_2}{x_1}$

Q.42 A 1 kg block attached to a spring vibrates with a frequency of 1 Hz on a frictionless horizontal table. Two springs identical to the original spring are attached in parallel to an 8 kg block placed on the same table. So, the frequency of vibration of the 8 kg block is

(A) $\dfrac{1}{2\sqrt{2}}$ Hz   (B) $\dfrac{1}{2}$ Hz   (C) 2 Hz   (D) $\dfrac{1}{4}$ Hz

Q.43 For a charged spherical ball, electrostatic potential inside the ball varies with r as $V = 2ar^2 + b$. Here, a and b are constant and r is the distance from the center. The volume charge density inside the ball is (ε = permittivity of medium.)

(A) $-12a\varepsilon_0$ (B) $-6a\varepsilon_0$ (C) $-3a\varepsilon_0$ (D) $-12a^2\varepsilon_0$

Q.44 As shown in the figure, in steady the charge stored in the capacitor is

(A) 10 μC   (B) 15 μC   (C) 20 μC   (D) 5 μC
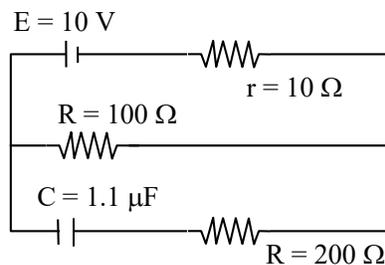
SPACE FOR ROUGH WORK

Q.45 The image formed by an objective of a compound microscope is

(A) virtual and diminished   (B) real and diminished

(C) real and enlarged   (D) virtual and enlarged

Q.46 Given figure shows few data points in a photo electric effect experiment for a certain metal. The minimum energy for ejection of electron from its surface is (Plancks constant h = 6.62×10^{-34} J.s)
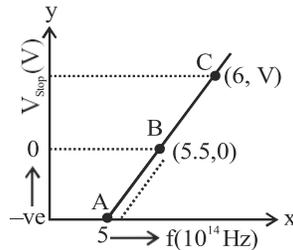

(A) 2.59 eV   (B) 2.27 eV   (C) 1.93 eV   (D) 2.10 eV

Q.47 A mirror produces a magnified erect image of an object. The nature of mirror is

(A) Neither convex or concave   (B) Plane

(C) Convex   (D) Concave

Q.48 A circuit having a self inductance of 1 henry carries a current of 1A. To prevent the sparking when the circuit is broken, a capacitor which can withstand 200 V is connected across the switch. What is the minimum value of the capacitance of the capacitor?

(A) 25 µF   (B) 20 µF   (C) 50 µF   (D) 5 µF

Q.49 The second overtone of an open pipe has the same frequency as the first overtone of a closed pipe of length 'L' The length of the open pipe will be

(A) $\dfrac{L}{2}$ (B) L   (C) 2L   (D) 4L

Q.50 In the hysteresis curve the value of magnetization (2) which will be present in a substance when value of magnetizing field (H) is made zero (H = 0) is called as

(A) coercivity   (B) retentivity

(C) domain   (D) saturation

SPACE FOR ROUGH WORK

CHEMISTRY

Q.51 A metal crystallizes in a body centered cubic lattice (bcc) with the edge of the unit cell 5.2Å. The distance between the two nearest neighbour is
(A) 10.4 Å   (B) 4.5 Å   (C) 5.2Å   (D) 9.0Å

Q.52 The coordination number and oxidation number of X respectively in the compound $[X(SO_4)(NH_3)_5]$ will be
(A) 10 and 3   (B) 1 and 6   (C) 6 and 2   (D) 6 and 4

Q.53 What is the weight of oxygen required for the complete combustion of 2.8 kg of ethylene?
(A) 2.8 kg   (B) 6.4 kg   (C) 9.6 kg   (D) 96 kg

Q.54 Which one of the following ions has the largest size in aqueous solution?
(A) Rb^+ (B) Na^+ (C) K^+ (D) Li^+

Q.55 IUPAC name for the compound having formula $C(CH_3)_4$ is
(A) Tetra methyl methane   (B) 1, 1, 1, 1-Tetramethyl methane
(C) 2, 2-Dimethyl propane   (D) 2, 2-Dimethyl isopropane

Q.56 Cl_2 on reaction with cold and dilute NaOH gives NaCl and
(A) NaOCl   (B) $NaClO_3$ (C) $NaClO_4$ (D) $NaClO_2$

Q.57 In an endothermic reaction, the value of ΔH is
(A) Zero   (B) Positive   (C) Negative   (D) Constant

Q.58 When conc. H_2SO_4 comes in contact with sugar, it becomes black due to
(A) hydrolysis   (B) hydration   (C) decolourisation   (D) dehydration

Q.59 Which of the following is not used for testing proteins?
(A) Molisch's test   (B) Biuret test   (C) Ninhydrin test   (D) Millon's test

Q.60 During isothermal expansion of an ideal gas, its
(A) internal energy increases   (B) enthalpy decreases
(C) enthalpy remains unaffected   (D) enthalpy reduces to zero.

SPACE FOR ROUGH WORK

Q.61 $CH_3 - CH_2 - CH_2 - CH_3 \xrightarrow[\Delta]{AlCl_3 + HCl} CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_3$
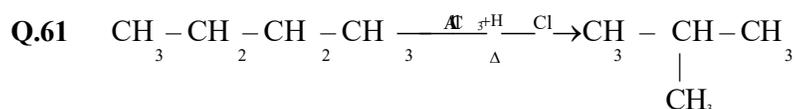
Above reaction is an example of :-
(A) Isomerization   (B) Polymerization   (C) Cracking   (D) Dehydrogenation
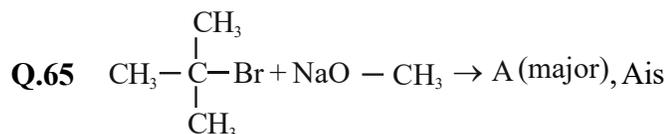
Q.62 The number of spherical nodes in 3p orbitals are/is
(A) one   (B) three   (C) none   (D) two

Q.63 The pair of compounds in which both the compounds give positive test with Tollen's reagent is
(A) Glucose and Sucrose   (B) Fructose and Sucrose
(C) Acetophenone and Hexanal   (D) Glucose and Fructose

Q.64 Which substance is serving as a reducing agent in the following reaction?
$$14H^+ + Cr_2O_7^{2-} + 3Ni \rightarrow 7H_2O + 3Ni^{2+} + 2Cr^{3+}$$
(A) H^+ (B) $Cr_2O_7^{2-}$ (C) H_2O (D) Ni

Q.65 $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - Br + NaO - CH_3 \rightarrow A\,(major),\, A\,is$

(A) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - O - CH_3$

(B) $CH_3 - \underset{\underset{CH_3}{|}}{C} = CH_2$

(C) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - OH$

(D) $CH_3 - O - CH_3$

Q.66 Which of the following compound is optically active?

(A) Br—⟨Cl, I, Cl⟩   (B) H—OH, HO—H (CH₃, CH₃)   (C) H—OH, H—OH (CH₃, CH₃)   (D) H—Me, H—Me (CH₃, CH₃)
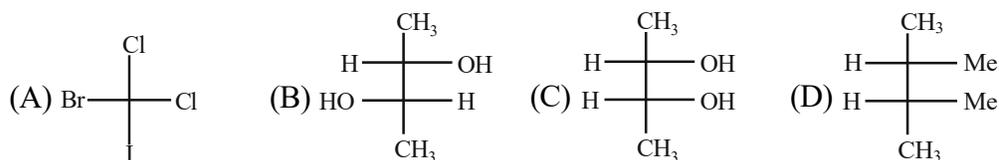
SPACE FOR ROUGH WORK

Q.67 According to Le-Chatelier's principle, adding heat to a solid ☐ liquid equilibrium will cause the :

(A) Temperature to increases (B) Temperature to decreases
(C) Amount of liquid to decreases (D) Amount of solid to decreases.

Q.68 Reaction of CH_2–CH_2 with RMgX leads to the formation of

(over O)

(A) RCH_2CH_2OH (B) $RCHOHCH_3$

(C) $RCHOHR$ (D) $\underset{R}{\overset{R}{>}}CHCH_2OH$

Q.69 An electrochemical cell is shown below :

Pt, H_2 (1 atm) |HCl (0.1 M)| CH_3 COOH (0.1 M)| H_2(1atm),Pt
The EMF of the cell will not be zero, because :
(A) EMF depends on molarities of acid used
(B) pH of 0.1 M HCl and 0.1 M CH3COOH is not same
(C) the temperature is constant
(D) acids used in two compartment are different

Q.70 In the following reaction, $C_6H_5COOCH_3$ $\xrightarrow[H_2O/H^+]{LiAlH_4}$ $A + B$

A and B are respectively
(A) $C_6H_5CH_2OH + HCOOH$ (B) $C_6H_5CH_2OH + CH_3OH$
(C) $C_6H_5OH + CH_3COOH$ (D) $C_6H_5COOH + CH_3OH$

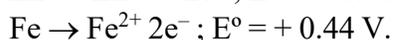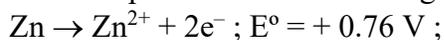**Q.71** The relative lowering of the vapour pressure is equal to the ratio between the number of
(A) Solute moleules and solvent molecules
(B) Solute molecules and the total molecules in the solution
(C) Solvent molecules and the total molecules in the solution
(D) Solvent molecules and the total number of ions of the solute

Q.72 When phenol is treated with excess bromine water. It gives :
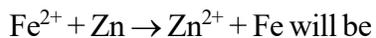(A) m-bromophenol (B) o and p-bromophenols
(C) 2,4-dibromiphenol (D) 2,4,6-tribromophenol

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Q.73 Electrode potential for the following half-cell reactions are
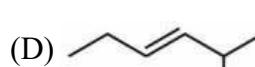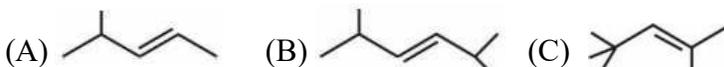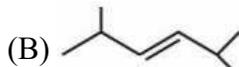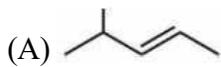$Zn \rightarrow Zn^{2+} + 2e^-$; $E^o = + 0.76$ V ;
$Fe \rightarrow Fe^{2+} 2e^-$; $E^o = + 0.44$ V.
The EMF for the cell reaction
$Fe^{2+} + Zn \rightarrow Zn^{2+} + Fe$ will be
(A) $- 0.32$ (B) $+ 1.20$ V   (C) $- 1.20$ V   (D) $+ 0.32$ V

Q.74 Which compound on reductive ozonolysis gives propanone as one of the product?

(A) ![structure]   (B) ![structure]   (C) ![structure]   (D) ![structure]

Q.75 A 5 amp. current is passed through a solution of zinc sulphate for 40 min. The amount of zinc deposited at
the cathode is :
[Atomic weight of Zn $= 65.3$]
(A) 40. 65 g   (B) 0.4065 g   (C) 4.065 g   (D) 65.04 g

Q.76 Which of the following is ambident nucleophile ?
(A) OH^- (B) $CN^{\ominus}$ (C) CH_3O^- (D) $Cl^{\ominus}$

Q.77 At 25°C, the highest osmotic pressure is exhibited by 0.1 M solution of
(A) $CaCl_2$ (B) KCl   (C) glucose   (D) urea

Q.78 Presence of a cyano group in a benzene ring.
(A) Activates the ring towards electrophilic substitution.
(B) Renders the ring basic.
(C) Deactivates the ring towards nucleophilic substitution.
(D) Deactivates the ring towards electrophilic substitution.

Q.79 All form ideal solution except
(A) C_2H_5Br and C_2H_5I (B) C_2H_5Cl and C_6H_5Br

(C) C_6H_6 and $C_6H_5CH_3$ (D) C_2H_5I and C_2H_5OH

Q.80 Which of the following reactions is appropriate for converting acetamide to methanamine?
(A) Hoffmann bromamide reaction.   (B) Stephen's reaction.
(C) Gabriel phthalimide synthesis   (D) Carbylamine reaction.

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Q.81 Activation energy (E_a) and rate constants (k_1 and k_2) of a chemical reaction at two different temperatures (T_1 and T_2) are related by
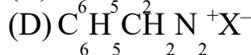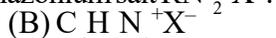
(A) $\ln \dfrac{k_2}{k_1} = -\dfrac{E_a}{R}\left(\dfrac{1}{T_1} - \dfrac{1}{T_2}\right)$

(B) $\ln \dfrac{k_2}{k_1} = -\dfrac{E_a}{R}\left(\dfrac{1}{T_2} - \dfrac{1}{T_1}\right)$

(C) $\ln \dfrac{k_2}{k_1} = -\dfrac{E_a}{R}\left(\dfrac{1}{T_2} + \dfrac{1}{T_1}\right)$

(D) $\ln \dfrac{k_2}{k_1} = \dfrac{E_a}{R}\left(\dfrac{1}{T_1} - \dfrac{1}{T_2}\right)$

Q.82 Which of the following will be most stable diazonium salt $RN_2^+X^-$?
(A) $CH_3N_2^+X^-$
(B) $C_6H_5N_2^+X^-$
(C) $CH_3CH_2N_2^+X^-$
(D) $C_6H_5CH_2N_2^+X^-$

Q.83 The data for the reaction $A + B \rightarrow C$, is

Exp.	$[A]_0$	$[B]_0$	Initial rate ($\times 10^{-4}$)
1	0.012	0.035	0.40
2	0.024	0.070	0.80
3	0.024	0.035	0.40
4	0.012	0.070	0.80

The rate law corresponds to the above data is
(A) rate $= k[A][B]^3$
(B) rate $= k[A]^2[B]^2$
(C) rate $= k[B]$
(D) rate $= k[B]^4$

Q.84 $CH_3CH_2COO^-Na^+ \xrightarrow[\text{Heat}]{N \ aO \ H+ \ ?} CH_3CH_3 + Na_2CO_3$

Consider the above reaction and idetify the missing reagent/chemical.
(A) Red Phosphorus
(B) CaO
(C) DIBAL-H
(D) B_2H_6

Q.85 For the reaction, $H^+ + BrO_3^- + 3Br^- \rightarrow 5Br_2 + H_2O$ which of the following relations correctly represents rate of the consumption and formation of products?

(A) $\dfrac{d[Br^-]}{dt} = -\dfrac{3}{5}\dfrac{d[Br_2]}{dt}$

(B) $\dfrac{d[Br^-]}{dt} = \dfrac{3}{5}\dfrac{d[Br_2]}{dt}$

(C) $\dfrac{d[Br^-]}{dt} = -\dfrac{5}{3}\dfrac{d[Br_2]}{dt}$

(D) $\dfrac{d[Br^-]}{dt} = \dfrac{5}{3}\dfrac{d[Br_2]}{dt}$

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Q.86 Which polymer is used in the manufacture of paints and lacquers ?

    (A) Bakelite   (B) Glyptal   (C) Polypropene   (D) Poly vinyl chloride

Q.87 Five moles of a gas is put through a series of changes as shown graphicallay in a cyclic process the
A → B, B → C and C → A respectively are

    (A) Isochoric, Isobaric, Isothermal
    (B) Isobaric, Isochoric, Isothermal
    (C) Isothermal, Isobaric, Isochoric
    (D) Isochoric, Isothermal, Isobaric

Q.88 Which of the following is not a correct statement about antioxidants in food?
    (A) They retard the action of oxygen on food
    (B) They are more reactive towards oxygen than food to be preserved
    (C) SO_2 cannot be used as antioxidant
    (D) BHT and BHA are most common antioxidants

Q.89 K_w of H_2O at 373 K is 1×10^{-12}. Identify, which of the following is incorrect :
    (A) pH + pOH = 12, for every aqueous solutions.
    (B) pH of pure H_2O is 6.
    (C) α_{H_2O} has increased from its value at 298 K.
    (D) Pure H_2O is acidic.

Q.90 Aqueous solution of NH_4Cl is _____ in nature due to behaviour of _____ ion in solution :
    (A) acidic ; NH_4^+ (B) alkalline ; NH_4^+
    (C) acidic ; Cl^- (D) alkalline ; Cl^-

Q.91 In a regular octahedral molecule, MX_6 the number of X – M – X bonds at 90° is
    (A) Twelve   (B) Two   (C) Six   (D) Four

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Q.92 The empty space between the shaded balls and hollow balls as shown in the diagram is called
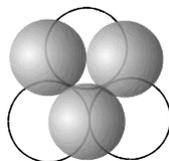
(A) hexagonal void　　　　　　　　　　(B) octahedral void

(C) tetrahedral void　　　　　　　　　　(D) double triangular void

Q.93 The bond that exists between NH_3 and BF_3 is called

(A) Electrovalent　　　　　　　　　　(B) Covalent

(C) Coordinate　　　　　　　　　　　(D) Hydrogen

Q.94 The tetrahedral voids formed by ccp arrangement of Cl^- ions in rock salt structure are

(A) Occupied by Na^+ ions　　　　　　(B) Occupied by Cl^- ions

(C) Occupied by either Na^+ or Cl^- ions　(D) Vacant

Q.95 In solid $CuSO_4.5H_2O$ copper is co-ordinated to

(A) 4 water molecules　　　　　　　　(B) 5 water molecules

(C) 1 sulphate molecule　　　　　　　(D) 1 water molecule

Q.96 A colloidal solution can be purified by the following method :

(A) dialysis　　　　　　　　　　　　(B) peptization

(C) filtration　　　　　　　　　　　(D) oxidation

Q.97 In an octahedral crystal field, the t_{2g} orbitals are

(A) raised in energy by $0.4\Delta_0$ from barycenter

(B) lowered in energy by $0.4\Delta_0$ from barycenter

(C) raised in energy by $0.6\Delta_0$ from barycenter

(D) lowered in energy by $0.6\Delta_0$ from barycenter

Q.98 Which of the following biodegradable polymer is commonly used in biomedical applications

(A) LDP　　　　　(B) PHBV　　　　　(C) LDA　　　　　(D) PAN

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Q.99 The highest oxidation state of Cr will be

(A) 2   (B) 3   (C) 4   (D) 6

Q.100 A thin balloon filled with air at 47ºC has a volume of 3 litre. If on placing it in a cooled room its volume becomes 2.7 litre , the temperature of room is :

(A) 42ºC   (B) 100ºC   (C) 15ºC   (D) 200ºC

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