UPCATET 2025 Question Paper

Time Allowed :3 Hours	Maximum Marks :800	Total Questions :200

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The question paper comprises 200 multiple-choice-questions, and must be completed in three hours duration.
2. There are four groups of paper: PCB, PCM, PAG, and PHS
3. Students appearing in the PCB Group can be admitted in subjects such as Agriculture, Fisheries, Horticulture, Home Science, Forestry and Veterinary Science.
4. Candidates applying for PCM group can secure admission in Agriculture, Horticulture, Home Science and B.Tech programs.
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6. 4 marks will be awarded for every correct answer, and 1 mark will be deducted for every wrong answer.

Physics

1. De-Broglie wavelength of α particle is the same as that of a proton moving with (1/10) of velocity as the speed of light. The ratio of K.E. of proton to that of α particle is:
(a) 2:1
(b) 1:4
(c) 4:3
(d) 4:1

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2. In hydrogen spectrum, the shortest wavelength in the Balmer series is λ. The shortest wavelength in the Bracket series is:
(a) 4λ
(b) 9λ
(c) 16λ
(d) 2λ

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3. Which property of light is used in an optical fiber?

(a) Interference
(b) Total internal reflection
(c) Diffraction
(d) Scattering

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4. An intrinsic semiconductor is converted into n-type extrinsic semiconductor by doping it with:
(a) Germanium
(b) Phosphorus
(c) Aluminium
(d) Silver

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5. A body of mass $m = 3.513\,\text{kg}$ is moving along the X-axis with a speed of $5.00\,\text{ms}^{-1}$. The magnitude of its momentum is recorded as:
(a) $17.6\,\text{kg ms}^{-1}$
(b) $17.565\,\text{kg ms}^{-1}$
(c) $17.56\,\text{kg ms}^{-1}$
(d) $17.57\,\text{kg ms}^{-1}$

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6. An object of mass $3\,\text{kg}$ is at rest. Now a force of $\vec{F} = 6t^2\hat{i} + 4t\hat{j}$ is applied on the object. The velocity of the object at $t = 3\,\text{s}$ is:
(a) $18\hat{i} + 3\hat{j}$
(b) $18\hat{i} + 6\hat{j}$
(c) $3\hat{i} + 18\hat{j}$
(d) $18\hat{i} + 4\hat{j}$

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7. A particle of mass m kg is suspended by a weightless string. The horizontal force that is required to displace it until the string makes an angle of 45° with the initial vertical direction is:
(a) $\frac{mg}{\sqrt{2}}$
(b) $mg(\sqrt{2} - 1)$
(c) mg
(d) $mg\sqrt{2}$

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8. AU measures:
(A) Temperature
(B) Distance
(C) Weight
(D) Time

9. T^2 vs l graph represents:
(A) A parabola
(B) A straight line passing through the origin
(C) A hyperbola
(D) A horizontal line

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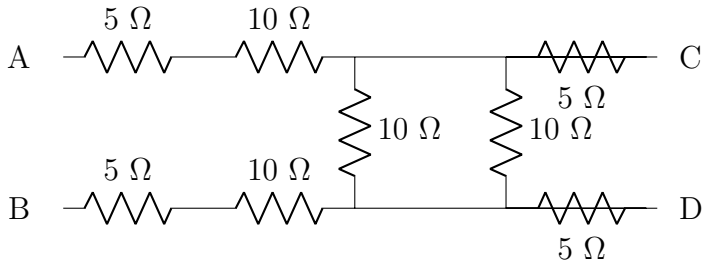
10. In the given circuit, the equivalent resistance between points A and D is:



(A) 20 Ω
(B) 25 Ω
(C) 35 Ω
(D) 40 Ω

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11. If an 18 Ω resistance wire is bent into the shape of an equilateral triangle, then the equivalent resistance across the ends of any side = ?
(A) 2 Ω
(B) 4 Ω
(C) 6 Ω
(D) 12 Ω

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12. If the weight of an object is 200 Newtons, then the weight of the object at the midpoint between the Earth's surface and the Earth's center will be:
(A) 50 N
(B) 100 N
(C) 150 N
(D) 200 N

Chemistry

1. The given reaction is known as:

$$PhCH_2CN + SnCl_2 + HCl \xrightarrow{H_3O^+} PhCH_2CH{=}NH$$

(a) Rosenmund reaction
(b) Stephen reaction
(c) Etard reaction
(d) Gatterman-Koch reaction

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2. Given below are two statements:
Statement I: Propene on treatment with diborane gives an addition product with the formula $((CH_3)_2CH)_3\,B$
Statement II: Oxidation of $((CH_3)_2CH)_3\,B$ with Hydrogen peroxide in the presence of NaOH gives propan-2-ol

In the light of the above statements, choose the most appropriate answer from the options given below:
(a) Statement I is correct but Statement II is incorrect
(b) Statement I is incorrect but Statement II is correct
(c) Both Statement I and Statement II are correct
(d) Both Statement I and Statement II are incorrect

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3. Which of the following aldehydes does not form iodoform on heating with I_2 and alkali?
(a) $CH_3 - C - CHO$
(b) $I - CH_2 - CHO$
(c) CH_3CH_2CHO
(d) $CH_3 - CH - CHO$

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4. Statement (A): Alkyl halides are not soluble in water.
Statement (B): Alkyl halides do not form H-bonds with water molecules through alkyl halide, but they are polar in nature.
In light of the above statements, choose the most appropriate answer from the options given below:
(a) Statement (A) is correct, B is incorrect
(b) Statement (A) is incorrect, B is correct
(c) Both are incorrect
(d) Both statements are correct

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5. Relation between rate constant and half-life for a first-order reaction is:
(a) $t_{1/2} = \frac{0.693}{K}$
(b) $K = \frac{t_{1/2}}{0.693}$

(c) $t_{1/2} = 0.693 + K$
(d) $t_{1/2} = \frac{K}{0.693}$

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6. An element has two isotopes having atomic masses 10 and 15 u, respectively. If the percent abundance of lighter isotopes is 80%, then the average atomic mass of the element is:
(a) 9 u
(b) 11 u
(c) 12 u
(d) 14 u

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7. If 0.01 mol of P_4O_{10} is removed from 0.1 mol, then the remaining molecules of P_4O_{10} will be:
(a) 2.7×10^{22}
(b) 5.4×10^{23}
(c) 5.4×10^{22}
(d) 1.35×10^{23}

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8. If a radiation of energy 4.25 eV falls on a metal surface, then the maximum kinetic energy of ejected electrons will be (work function of metal is 2.25 eV).
(a) 4.5×10^{-16} J
(b) 6.5×10^{-19} J
(c) 3.2×10^{-19} J
(d) 1.6×10^{-19} J

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9. Incorrect match of IUPAC symbol of elements with its respective atomic number is:
(a) Sg – 106
(b) Mt – 109
(c) Bh – 105
(d) Hs – 108

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10. Polar molecule among the following is:
(a) BF_3
(b) XeF_4
(c) CCl_4
(d) NH_3

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11. Minimum bond length is of:
(a) O_2
(b) O_2^+
(c) O_2^-
(d) O_2^{2-}

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12. No work is done during free expansion of an ideal gas:
(A) Only in reversible isothermal process
(B) Only in irreversible isothermal process
(C) Both in reversible and irreversible isothermal process
(D) Only in reversible adiabatic process but not in irreversible adiabatic process

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13. Hybridisation of Ni in $[Ni(CN)_4]^{2-}$ is:
(A) sp^3
(B) dsp^2
(C) sp
(D) sp^3d

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14. Unit of K_C for equilibrium:
(A) mol L^{-1}
(B) L mol^{-1}
(C) mol^2L^{-2}
(D) Dimensionless

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15. Solubility of AgCl in 10^{-2}MNaCl solution is ($K_{sp_{AgCl}} = 1.8 \times 10^{-10}$):
(A) 10^{-2}M
(B) 1.8×10^{-12}M
(C) 1.8×10^{-8}M
(D) 1.8×10^{-2}M

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16. In the balanced redox reaction $Cr_2O_7^{2-} + SO_3^{2-} \longrightarrow Cr^{3+} + SO_4^{2-}$, the ratio of the number of $Cr_2O_7^{2-}$ ions to SO_4^{2-} ions is:
(A) 1 : 1
(B) 1 : 2
(C) 1 : 3
(D) 2 : 3

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17. Oxidation number of hydrogen is (-1) in:

(A) NaH_2PO_4
(B) $NaHSO_4$
(C) $NaBH_4$
(D) H_2

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18. The group which shows $-I$ and $-R$ effect is:
(A) $-Cl$
(B) $-OR$
(C) $-NO_2$
(D) $-NHCOR$

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19. Correct order of first ionisation energy of B, In, Ga, and Al is:
(A) B > Al > Ga > In
(B) B > Ga > Al > In
(C) B > In > Ga > Al
(D) Al > B > Ga > In

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20. Which among the following is not an aromatic species:
(A) Benzene
(B) Cyclopentadienyl anion
(C) Cyclobutadiene
(D) Pyrrole

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21. Benzene on reaction with benzoyl chloride in the presence of anhydrous $AlCl_3$ forms:
(A) Acetophenone
(B) Benzophenone
(C) Phenyl benzoate
(D) Benzoic anhydride

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22. The emf of the cell $Ni_{(s)} \left| Ni^{2+}(0.16\,M) \right| Ag^{+}(0.002\,M) \left| Ag_{(s)} \right.$ is ($E^0_{\text{cell}} = 1.05\,V$):
(A) $-0.91\,V$
(B) $+0.46\,V$
(C) $+0.91\,V$
(D) $-0.75\,V$

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23. How many structural isomers does C_7H_{16} have:

(A) 66
(B) 7
(C) 8
(D) 9

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24. Molecularity of a reaction can be:
(A) Zero
(B) -2
(C) 1
(D) 0.5

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25. Cell constant is equal to:
(A) Conductivity $\times$ Resistance
(B) Conductivity / Resistance
(C) $\frac{1}{A}$
(D) (A) and (C) both

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26. In which of the following elements the 6d orbital is vacant:
(A) Lr
(B) Cm
(C) Np
(D) Fm

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27. Optical isomerism is shown by:
(A) $[\mathrm{Co}\,(\mathrm{NH_3})_5\,(\mathrm{NO_2})]^+$
(B) $[\mathrm{Co(en)_3}]^{3+}$
(C) $[\mathrm{Co}\,(\mathrm{NH_3})_4\,\mathrm{Cl_2}]^+$
(D) $[\mathrm{Co}\,(\mathrm{NH_3})_3\,\mathrm{Cl_3}]$

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28. For the same metal, same ligands, and metal-ligand distances, the correct relation is:
(A) $4\Delta_t = 9\Delta_o$
(B) $2\Delta_t = 7\Delta_o$
(C) $9\Delta_t = 4\Delta_o$
(D) $3\Delta_t = 5\Delta_o$

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29. The coordination number and oxidation number of Cr **in** $\mathrm{K}\,[\mathrm{Cr}\,(\mathrm{H_2O})_2\,(\mathrm{C_2O_4})_2]$ **are:**

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

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30. Electrophile used in Kolbe's reaction is:
(A) Carbondioxide
(B) Dichlorocarbene
(C) Carbommonoxide
(D) Acyl carbocation

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31. Schiff's base is formed by the reaction of aldehyde with:
(A) Ammonia
(B) Amines
(C) Hydrazine
(D) Phenyl hydrazine

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32. Denaturation of alcohol is done by the help of:
(1) $CuSO_4$ + Pyridine
(2) H_2SO_4
(3) $ZnSO_4$
(4) HCl

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33. The compound which does not react with ammonical silver nitrate solution is:
(A) 2-methyl propanal
(B) 2-methyl cyclopentanone
(C) 3-methyl benzaldehyde
(D) Methanoic acid

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34. When benzene diazonium chloride is treated with ethanol, the product obtained is:
(A) Aniline
(B) Phenetole
(C) Benzene
(D) p-Chloro phenol

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35. The amine which is most basic in gas phase is:
(A) CH_3NH_2
(B) NH_3

(C) $(CH_3)_2NH$
(D) $(CH_3)_3N$

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36. Which among the following is fibrous protein:
(A) Keratin
(B) Insulin
(C) Myosin
(D) Both (A) and (C)

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37. Which of the following amines will give most easily N_2 gas on treatment with $NaNO_2 + HCl$ at 275 K:
(A) $C_2H_5NH_2$
(B) $C_6H_5NHCH_3$
(C) $C_6H_5NH_2$
(D) $(CH_3)_3N$

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38. Which of the following is a double salt:
(A) $KCl \cdot MgCl_2 \cdot 6H_2O$
(B) $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$
(C) $KAl(SO_4)_2 \cdot 12H_2O$
(D) All of above

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39. Which of the following fluid has $pH < 7$:
(A) Egg white
(B) Sea water
(C) Human blood
(D) Human saliva

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40. Ratio of time required for 99% completion vs 90% completion of a first order reaction is:
(a) $\frac{99}{90}$
(b) 2
(c) $\frac{10}{9}$
(d) 1
