KEAM 2026 Engineering April 20

Question Paper (Memory-Based)

Conducted by CEE Kerala

General Instructions

- **Duration:** The total duration of the examination is 1.5 hours (90 minutes).
- **Total Marks:** The complete paper carries a maximum of 300 marks.
- **Structure:** The paper has 2 Sections:
  - **Section A:** 30 Multiple Choice Questions (Physics).
  - **Section B:** 45 Multiple Choice Questions (Chemistry).
- **Compulsory Questions:** All 75 questions are compulsory.
- Each question has four options. Only **one** option is correct.
- **Correct Answer:** +4 marks.
- **Incorrect Answer:** −1 (Negative marking).
- **Unanswered/Marked for Review:** 0 marks.

PHYSICS

1. A Bar magnet has a magnetic moment M and length l. If its length is reduced to half, find its new magnetic moment.

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2. What is the ration of Debroglie wavemength of proton and neutron if kinetic energy is same for both

3. A 250W bulb emit light of wavelength 19.6nm. Find the no of electron emitted per second

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4. Find difference in work function of two different metal if their stopping potential are 0.4V and 1.6V respectively.(metals are illuminated with photons of same energy)

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5. An α particle and proton are accelerated in cyclotron under idential conditions. Find the ratio of their cyclotron frequncy

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6. Two springs with constants k and 2k are connected in series and a mass m is hanged. The time period of oscillation is

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7. An oil drop of charge q and mass m is in equilibrium in an electric field E. The charge of the oil drop is

(A) $q = \frac{mg}{E}$
(B) $q = \frac{E}{mg}$
(C) $q = \frac{mg}{2E}$
(D) $q = \frac{mg}{4E}$

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8. displacement of particle is given by $x = t^{3/2} + 2$, find time at which velocity becomes zero

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9. Time period of particle is $T = k\sqrt{\frac{\rho r^3}{\sigma}}$ if k $\rightarrow$ dimensionless constant, ρ - density, r - radius, dimension of σ is same as

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(A) surface tension

(B) restoring force

(C) coefficient of viscosity

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10. If two objects of mass $m_1 = 80$g and $m_2 = 120$g moves with same speed 6cm/s, find the velocity of centre of mass

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11. An object of mass m is placed in a lift moving upward with acceleration g/2. Find apparant weight.

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12. If temperature is constant and the electric field is doubled then the drift velocity of electrons in a conductor.

(A) doubled

(B) remains the same

(C) halved

(D) quadraupled

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13. If wavelength of light and separation between slit and screen are fixed. If the slit width is halved, then the angular width become

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14. Energy of radiation incident on a perfect absorbing surface per unit are in unit time is 3.6J. The radiation pressure is:

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15. 64 identical spheres each having charge q coalesce to form one big sphere. Find the ratio of the surface charge density of the big sphere to that of small sphere

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16. Two identical cells having internal resistance 1Ω and emf 6v and 2v are connected in series with external resistance 4Ω, find current throught external resistance

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17. A brass of length 1m is heated throught a temperature rise of 50°C. Find thermal stress developed in the rod
($\alpha = 2 \times 10^{-5}\ ^{\circ}\mathbf{c}^{-1}, Y = 1 \times 10^{11}\ \mathbf{N/m}^2$)

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18. Two bodies of same mass having temperature T_1 and T_2 place kept contact. Specific heat capacity of bodies are s and 1.2s respectively. find equilibrium temperature.

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19. Force acting on a particle varies with time t as F = kt, k is a constant. The vecocity of the particle after a time t is

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20. If rms speed is increased 20% and volume is kept constant, then increase in pressure is

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21. Ripple frequency of a full wave rectifier is

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22. If resistance of a conductor at 20°C is 10Ω, then the resistance at 80°C is $[\alpha = 4 \times 10^{-3}\ ^{\circ}\mathbf{c}^{-1}]$

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23. If T is the time period of satellite in an orbit of radius r, then the time period in an orbit of radius 3r is:

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24. A circular coil of radius 10cm with 200 turns is placed $\perp$r to uniform magnetic field of 1.4T. IF magnetic field reduced to zero in 0.2s, what is the average induced emf

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25. The direction of electric field at a point just outside a positively charged spherical conductor is

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26. If kinetic energy of one mole of monatomic gas is 24.4J, then temperature is(R = 8.314)

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27. In Bohr's theory of hydrogen atom if speed of an electron in the first orbit is v, then the speed in 3rd orbit is

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28. A solenoid has 1000 turns per meter and carries a current of $\frac{7}{\pi}$A . The magnetic field inside the solenoid is

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29. In ac circuit containing an ac source of frequency f, the capacitance is proportional to

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30. Area under velocity- time graph of a particle is equal to

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31. A block of mass 2kg slides on a rough horizontal surface ($\mu_k = 0.2$) with initial speed 10m/s. Find the stopping distance

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32. The maximum and minimum distances of a planet from sun are r_1 and r_2 respectively. If minimum velocity is V_1 and minimum velocity is V_2, then the ration $V_1 : V_2$ is:

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CHEMISTRY

1. Which among the following has least pK_b value?

(A) Methanamine

(B) Ethanamine

(C) N-ethylethanamine

(D) N,N-diethyl ethanamine

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2. Find the order of metallic radius of

Mg, Li, Be, B, Al

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3. Find the order of field strength

CN^-, SCN^-, NCS^-, S^{2-}, OH^-

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4. IUPAC name $[CoCl_2(en)_2]Cl$

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5. Find the mass of an organic compound of molar mass 84, required to prepare 250 ml solution of molarity 0.4

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6. An organic compound (X) on reductive ozonolysis gave 1 mole of propanal-pent-3-one. Name the organic compound X.

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7. Velocity of Ist orbit of hydrogen according to Bohr theory 'v', then what is the velocity of 3rd orbit of hydrogen

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8. What are possible structural isomers of $C_3H_6Cl_2$

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9. Find the order of magnitude of electrode potential ($E^{\circ}_{M^{2+}/M}$) of
Cr, V, Mn, Fe, Co

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10. product of aldol condensation is 1,3-diphenyl pro-3-ene-1-one, then its reactants are

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11. 

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12. Which metal added in fuel cell to make it more efficient?

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13. Total no. of electron present around the central atom in order of PCl_5, SF_6, SCl_2

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14. CO_2 is taken in a closed container initially at a pressure of 0.6 atm at 1500 K. After the addition of solid C, some of CO_2 is converted to CO. The equilibrium pressure is then 0.9 atm. Calculate the velocity of k_p at 1500K.

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15. The rate of constant of a reaction at 400K and 500K are $0.04\ \text{m}^{-1}$ and $0.08\ \text{m}^{-1}$ respectively. The Ea of the reaction is about ($2.303\text{R} = 19.15\ \text{J/k/mol}$)

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16. The technique is used to purify liquid having very high b.p and decompose at or below this boiling point is

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17. ΔG for $3\text{X}_{(g)} + 2\text{Y}_{(g)} \rightarrow 3\text{Z}_{(g)}$ at 293 K is
($\Delta\text{H}^\circ = -13\ \text{kJ/mol}$, $\Delta\text{S}^\circ = -45\ \text{J/mol}$)

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18. The major products formed by heating $\text{C}_6\text{H}_5\text{CH}_2 - \text{O} - \text{C}_6\text{H}_5$ with HI are

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19. In the reaction, $\text{O}_{2(g)} + 4\text{H}^+_{(aq)} + 4\text{e}^- \rightarrow 2\text{H}_2\text{O}_{(l)}$, the quantity of electricity required to reduce one mole of gaseous oxygen is ($E^\circ = 1.23\text{V}$)

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20. A 250 watt bulb emits monochromatic light wavelength 198.78 nm. How many photons are emitted by the bulb per second?

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21. For the equilibrium,
$2\text{A}_{(g)} \rightleftharpoons 2\text{B}_{(g)} + 2\text{C}$
the value of Kp is 0.1662 atm at 1000K. The value of Kc at same temperature is (R = 0.0831)

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22. Match the following
Methyl chloride - Antiseptic
Chloroform - Metal washing

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Iodoform - Propellant

CCl_4 - Solvent for I_2

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23. If the reaction is 3^{rd} order, if the conc. of reactant is doubled, then the rate is

(A) Increased twice

(B) Increased 8 times

(C) Unchanged

(D) Decreased 2 times

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24. 3g of Benzoic acid is added to 25g Benzene. $\Delta T_f = 2.5K$ and K_b of Benzene is 5. What is the experimental molecular mass of Benzoic acid?

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25. The bond between $3'$ and $5'$ carbon of pentosed sugar of nucleotide is called

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MATHEMATICS

1. $\int_{\pi/6}^{\pi/3} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}\, dx$

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2. $\int \tan\frac{\theta}{2} \sin\theta \cos\theta \, d\theta$

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3. $i^2 = -1$, then $i^2 + i^3 + i^4 + \cdots + i^{2026}$

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4. If A is a square matrix then which of the following is true

(1) $A+A^T$ is symmetric and $A-A^T$ is skew symmetric

(2) $A+A^T$ is skew symmetric and $A+A^T$ is skew symmetric

(3) $A+A^T$ and $A-A^T$ are symmetric

(4) $A+A^T$ and $A-A^T$ are skew symmetric

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5. $\int \frac{1}{(1+x^2)\left[\tan^{-1}\left(\frac{1+x}{1-x}\right)\right]}\,dx$

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6. Find the equation of the straight line passing through the point $(-1,6,5)$ **and** $(-2,4,3)$

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7. Solve the differential equation $(2y-1)dy-(y-2)dx=0$

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8. $\lim_{x\to 0}\frac{\sin|x|}{x}$

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9. $\int \frac{1}{1+e^t}\,dt$

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10. $\int e^x(2e^x+\sin x+\cos x+2)\,dx$

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11. $\int \frac{y^2-3y+2}{y^2+y}\,dy$

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12. $\int_6^5 \frac{(x+8)^{2026}}{(x+8)^{2026}+(13-x)^{2026}}\,dx$

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13. $\left|\frac{\cos\alpha+i\sin\alpha}{\sin\alpha-i\cos\alpha}\right|^{1000}+\left|\frac{\sin\alpha+i\cos\alpha}{\cos\alpha-i\sin\alpha}\right|^{2000}$

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14. Consider the data $x_1, x_2, \ldots, x_{10}$**. If** $\sum_{i=1}^{10}(x_i-\bar{x})^2=662$ **find standard deviation.**

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15. If ${}^nC_4=1365$ **then** $n=$

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16. A straight line has y-intercept -5. If it makes 120° **with the x-axis then the equation of the line is**

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17. $\int_0^1 \frac{x^{15}}{1+x^{32}}[\cos(\tan^{-1}x^{16})]\,dx$

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18. Value of $\sin 5^\circ\times\sin 10^\circ\times\sin 15^\circ\times\sin 20^\circ\times\cdots\times\sin 240^\circ$

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19. $z_1=1+3i, z_2=-3i+5$ **then** $(z_1\bar{z}_2+z_2\bar{z}_1)+(z_1\bar{z}_2+z_2\bar{z}_1)$ **is equal to**

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20. The value of the determinant

$$\begin{vmatrix} (10^5+10^{-5})^2 & (10^5-10^{-5})^2 & 1 \\ (100^6+100^{-6})^2 & (100^6-100^{-6})^2 & 1 \\ (6^{100}+6^{-100})^2 & (6^{100}-6^{-100})^2 & 1 \end{vmatrix}$$

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21. Given that $p^2=-1$**, if** $z_1=(7+i\sqrt{5})^2+(7-i\sqrt{5})^2$ **and** $z_2=(3+2i)^3-(3-2i)^3$ **then**

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(1) z_1 is a purely imaginary number and z_2 is purely real no.

(2) z_1 is a purely real number and z_2 is a purely imaginary

(3) both z_1 and z_2 purely real

(4) both z_1 and z_2 purely imaginary

(5) $z_1 + z_2$ purely real

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22. $\lim_{x \to \frac{\pi}{2}^-} (\tan x - \sec x) =$

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23. $\int_{-4}^{4} (x - [x])\, dx$

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24. Let $f(x) = \frac{2025x+2026}{2027x-2025}, x \in \mathbb{R}, x \neq \frac{2025}{2027}$ **be a function. Then** $f^{1000}(100)$ **where** $f^2(x) = f(f(x))$ **is equal to**

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25. Let O be the origin and R be any point on $y^2 = 2x$**. The locus of the midpoint of the line segment OR is**

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26. Let the eccentricity of an ellipse be $\frac{1}{2}$**. If S(3, 2) is a focus and** $x - 9 = 0$ **is the corresponding directrix of the ellipse. Find equation of ellipse?**

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27. The order and degree of the differential equation $\left(1 + \frac{dy}{dx} + \frac{d^2y}{dx^2}\right)^{3/2} = \left(x + y + \frac{dy}{dx} + \frac{d^3y}{dx^3}\right)^{2/3}$

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28. The number x is randomly chosen from the set of natural numbers lessthan or equal to 100. Then the probability of the event that the choosen number satisfies the inequality $\frac{(x-15)(x-70)}{(x-30)} \geq 0$ **is**

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