

KEAM 2026 Engineering April 19

Question Paper

Conducted by CEE Kerala



General Instructions

- (i) **Duration:** The total duration of the examination is 3 hours (180 minutes).
- (ii) **Total Marks:** The complete paper carries a maximum of 600 marks.
- (iii) **Structure:** The paper has 3 Sections:
 - **Section A:** 45 Multiple Choice Questions (Physics).
 - **Section B:** 30 Multiple Choice Questions (Chemistry).
 - **Section B:** 75 Multiple Choice Questions (Mathematics).
- (iv) **Compulsory Questions:** All 150 questions are compulsory.
- (v) Each question has four options. Only **one** option is correct.
- (vi) **Correct Answer:** +4 marks.
- (vii) **Incorrect Answer:** -1 (Negative marking).
- (viii) **Unanswered/Marked for Review:** 0 marks.

Physics

1. A spherical conductor contains 5×10^6 electrons. If the Radius of the sphere is 10cm, find the electricfield at its surface

2. Find the total energy released when 235g of $^{235}_{92}\text{U}$ undergoes complete fission. Assume that the energy released per fission is about 200 MeV

3. Transverse wave in a string is given by $y = 3 \sin 2(25t + 0.4x)$ m What is the velocity of wave?

4. A ball of mass 200g strikes a wall with a speed 5m/s and rebounds with same speed in the opposite direction. If the average force exerted on the —is 5N, find the time of contact between the ball and wall

5. Two identical cells, each of emf 2V and internal resistance 0.1Ω , are connected in parallel. Find effective emf and the effective internal resistance of the combination.

6. A copper wire of cross sectional area 2mm^2 carries a current I and has drift velocity V_1 . Another copper wire of cross- sectional area 1.5mm^2 carries a current $2I$ and has drift velocity v_2 . Find ratio $\frac{V_1}{V_2}$

7. A solid sphere of radius 20cm has the same mass as a solid cylinder. If their moments of inertia about their respective central axes are equal, find radius of the cylinder.

8. In which thermodynamic process does the internal energy of an ideal gas remain unchanged?

9. A gun fires 25 bullets per second. Each bullet has a mass of 10g and is fired with a velocity of 20m/s. Find the recoil force on gun.

10. A satellite moves in an elliptical orbit around planet such that its maximum distance and minimum distance from planet are in the ration 3:1. If its speed at the nearest point(perigee)is

V, find its speed at the farthest point (Apogee)

11. A particle moves such that its position is given by $y = t^2 + 2t + 3(\text{m})$. Find the average acceleration of the particle between $t = 3\text{s}$ and $t = 6\text{s}$

12. $A = \frac{B}{CD^2}$, If B, C and D have dimension of inductance reactance, capacitive reactance and angular frequency. then dimension of A

13. A beam of unpolarized light of intensity I_0 is incident on a polarizer. A second polaroid is placed in the path such that its transmission axis makes an angle of 45° with the first polaroid. What is the intensity of light after it passes through the second polaroid.

14. For an electron of mass m and charge ' e ' ratio of angular momentum to magnetic

15. Which of the following have highest modulus of elasticity

- (A) Steel
 - (B) Aluminium
 - (C) Brass
 - (D) Glass
-

16. At which condition do the experimental P-V curve and predicted P - V curve closely match?

- (A) Low temperature and high pressure
 - (B) low temperature and low pressure
-

17. Which law is the symmetrical counter part of Faradays law in electromagnetic induction

- (A) Ampere Maxwell law
 - (B) Ampere Circuital law
 - (C) Gauss's law
 - (D) Coulombs law
-

18. A wire of fixed length is bent into a single circular turn, producing a magnetic field B at its center. If the same wire is bent into 3 circular turns (carrying the same current), What will be the magnetic field at the centre

19. find rms current

$$i = 4\sqrt{2}\sin \omega t + 3\sqrt{2}\cos \omega t$$

20. Ratio of distance travelled by a freely falling body in successive intervals of time is

21. A block of 10kg mass moving on a frictionless surface with 5m/s compresses the spring by 5cm and comes to rest. What is the force constant of the spring.

22. A uniform rod of mass m and length l rotating in a horizontal circle about a vertical axis passing through one of its ends with angular velocity ω . What is the angular momentum of the rod

23. If threshold wavelengths of two metals are in the 3:1. What is the ratio of their work function.

24. If the electric potential is $V = 3x^2 + 4x$, then magnitude of Electric field at $x = 1\text{m}$ is

25. Which of the following is not extensive variable.

A) total mass B) internal energy

C) Volume D) Density E) Work done

(A) total mass

(B) internal energy

(C) Volume

(D) Density

(E) Work done

26. What is the mass of one molecules of water in kg

27. A capacitor as capacitance $C = 9\text{pF}$. If the energy stored in it is $18 \times 10^{-8}\text{J}$. Find charge stored in capacitor.

28. The radius of inner most orbit of Hydrogen is $0.53\text{\AA}$. What is the radius of 3rd orbit

29. Order of the electric field required to pull out electrons from a metal by field emission is

30. Relative viscosity of blood $\frac{\eta}{\eta_{\text{water}}}$ is constant in which temperature range

31. Magnifying power of simple microscope can be increased by using.

32. In a Si crystal containing N atoms at absolute zero, energy state of

33. $2q$ and q having equal momentum enter uniform magnetic field in a direction perpendicular to magnetic field. Find ratio of radii

34. Instantaneous displacement of a wave is $y = 2(\sin pt + \sqrt{3} \cos pt)$ cm . Find amplitude of wave in cm.

35. In an air core solenoid with $L = 0.5\text{mH}$ filled with soft iron of relative permeability 1500. Find new L

36. Bar magnet is rotated from parallel position to 45° position work done is 2.07J. Find workdone to rotate from 45° to antiparallel position.

37. Real object is placed at focus in front of a convex mirror of focal length f . Find the distance to the image formed.

38. Ratio of magnitude of gravitational potential energy to that of kinetic energy of with satellite of mass m

39. Uniform metallic wire of radius ' r ' and length ' ℓ ' is heated by passing constant current. The heat produced can be made $1/4$ times if

- (A) 2ℓ
(B) $\frac{\ell}{2}, \frac{r}{2}$
(C) $2\ell, \frac{r}{2}$
(D) $2r$
(E) $2\ell, 2r$
-

40. Capillary tubes of radii 1 : 2 are dipped in same solution. Then the ratio of height of liquid rise is

Chemistry

1. Reagent used to convert decanol to decanoic acid

- (A) Tollen's reagent
(B) Jones reagent
(C) Grignard reagent
(D) Fehling's reagent
(E) DIBAL-H
-

2. IUPAC name of $(\text{CH}_3)_3\text{C}-\text{CH}_2\text{Br}$

3. Geometry of a molecule AB_3E_2 with 3 bond pairs and 2 lone pairs

4. Which do not form carbylamine

- (A) Ethanamines
(B) Benzamine
(C) Prop-2-amine
-

- (D) Propan-1-amine
(E) N-methylethanamine
-

5. Which transition metal has more than one metallic structure at normal temperature?

- (A) Cr
(B) Ni
(C) Mn
(D) V
(E) Cu
-

6. An organic compound $C_5H_{10}O$ does not reduce Tollen's reagent but forms addition compound with sodium hydrogen sulphite and gives the Iodoform test. On vigorous oxidation, it gives ethanoic acid and propanoic acid.

7. Which are complex reaction

- (i) Oxidation of ethane
(ii) Thermal decomposition of HI on gold surface
(iii) Saponification of methyl acetate
(iv) Nitration of phenol
(v) Decomposition of NH_3 on hot Pt surface
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8. Conc. of H ions in HCl solution is $3 \times 10^{-3}M$ then pH = ———?

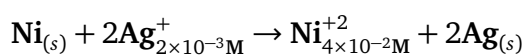
9. Mass of ethanoic acid required to prepare 0.5m solution containing 100g of water?

10. Spin only magnetic moment given not correct is

- (A) Ni^{2+} (4.73)
(B) Fe^{2+} (4.90)
(C) Ti^{2+} (2.84)
(D) CO^{2+} (3.89)
(E) Mg^{2+} (5.92)
-

11. Minimum energy required to remove an atom from sodium is $3.313 \times 10^{-19} \text{ g}$. Maximum wavelength of radiation that will get photoelectron

12. Find the emf of the reaction at 298K



($E_{\text{cell}}^0 = 1.5$ at 298K)

13. $\text{X}_2 + \text{O}_2 \rightleftharpoons 2\text{XO}$

Concentration of X_2 and O_2 are 4×10^{-3} and 3×10^{-3} respectively. Equilibrium concentration of XO ($K_c = 0.5$)

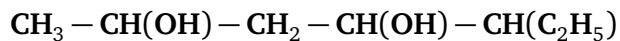
14. Which pairs have ability to form $p\pi - p\pi$ multiple bonds

- (A) C and O
(B) B and N
(C) N and P
(D) F and Cl
(E) C and Si
-

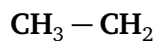
15. Pyridinium chlorochromate is a complex of

16. In Chemotherapy, liqannd used to remove excess of Cu

17. IUPAC name of



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18. Which are carcinogenic hydrocarbon

(i) 1,2 - Benzanthracene

(ii) pent-1-yne

(iii) 1,2 - Benpyrene

(iv) cyclohexane

(v) 3-methyl cholanthrene

19. Metals used in preparation of dihydrogen in lab

20. Volume ofmethanol to make 2L of 0.4M solution

(density = 0.64KgL^{-1} , MM = 32 g mol^{-1})

21. Enthalpy of combustion of benzene, graphite, dihydrogen are -3260 , -390 and -290 kJ/mol .
Find the enthalpy of formation of benzene

Maths

1. If $9P_5 = 504(6P_r)$. Find λ

2. If $\vec{a} = 2\hat{i} - 2\hat{j} + 4\hat{k}$ $\vec{b} = -5\hat{i} - \hat{j} + 8\hat{k}$ and $\vec{c} = 3\hat{i} + \hat{j} - \lambda\hat{k}$. If $\vec{a} + \vec{b} + \vec{c}$ is perpendicular to $\vec{a} - \vec{b} + \vec{c}$
Find λ

3. Find $\begin{vmatrix} 11 & 1 & 1 \\ 1 & 21 & 1 \\ 1 & 1 & 31 \end{vmatrix}$

4. Find the eqn of the line passing through $(-1, 2, -4)$ and parallel to $\frac{-x-1}{4} = \frac{2y+1}{-1} = \frac{-z+4}{3}$

5. Find the minimum value of $f(x) = \frac{x^{100}-1}{x^{100}+1}$

6. If $y = \frac{3x^3-2x^2+x}{|x|}$, $x \neq 0$ find $\frac{dy}{dx}$ at $x = -2$

7. $\int \frac{\sin(\cot^{-1} x)}{1+x^2}$

8. Find the number of terms in $2, 6, 18 \dots 1458$

9. Find the domain of $\frac{\log(x-5)}{x^2+3x-4}$

10. $\lim_{x \rightarrow 0} \left[\frac{\sin^2 x}{1 - \cos x} \right]$

11. If $\tan \alpha = \frac{5}{6}$, $\tan \beta = \frac{1}{11}$ ($0 < \alpha, \beta < \frac{\pi}{2}$)

12. Find the sum of all 3 digit numbers using the digit 1, 2, 3, 4 without repetition

13. $\int_0^1 \left[\tan^{-1} \left(\frac{1}{1+x+x^2+x^3} \right) + \tan^{-1}(1+x+x^2+x^3) \right] dx$

14. Find the differential equation of $y = Ae^x + Be^{-2x}$

15. Solve $5 < |x - 1| < 15$

16. Find the value of $\sin \left(2 \sin^{-1} \frac{3}{5} \right)$

17. If $f(x) = x^2 + 4x + 4$; $x \leq -2$. Find $f^{-1}(x)$

18. Find the length of latus rectum of $y^2 + 8x + 4y + 12 = 0$

19. Find $\sin^{-1} \left(\sin \frac{5\pi}{9} \cdot \cos \frac{\pi}{9} + \sin \frac{\pi}{9} \cdot \cos \frac{5\pi}{9} \right)$

20. If $Z_1 = \frac{5+7i}{7-5i}$, $Z_2 = \frac{3+2i}{3-2i}$, $Z_3 = \frac{1+11i}{11-i}$. Find the value of $Z_1 \times \overline{Z_1} + Z_2 \overline{Z_2} + Z_3 \overline{Z_3}$

21. Find the eqn of the parabola having vertex $(2, -5)$ and focus $(5, -5)$

22. If $(3 + i)x + (1 - i)y + (3i - 4) = (2x + 1) + (x - y + 2)i$. Find (x, y)

23. Find the shortest distance b/w the line $\vec{r} = -\hat{i} + t\hat{k}$ and $\vec{r} = -\hat{j} + S\hat{i}$; $t, S \in R$

24. $\lim_{x \rightarrow 0} \frac{\sqrt{1 - \cos(x^2)}}{1 - \cos x}$

25. $\int \frac{\sin t + \cos t}{13 + 36 \sin 2t} dt$

26. $\lim_{x \rightarrow 1} \frac{x-1}{\sqrt[3]{x}-1}$

27. If $f(x) = \frac{2x+3}{x-2}$; $x \neq 2$ and $x \in R$

28. If $P = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 10 & 100 & -1 \end{bmatrix}$ Find P^{4052}

29. If $|\vec{a}| = \sqrt{26}$, $|\vec{b}| = \sqrt{3}$ $\vec{a} \times \vec{b} = 5\hat{i} + \hat{j} - 4\hat{k}$. Find $\vec{a} \cdot \vec{b}$

30. In a GP $a_1 = 7$, $a_n = 448$ and $S_n = 889$. Find the common ratio of the G.P

31. If R $(-2, 2)$ is a point on the ellipse $\frac{(x-3)^2}{25} + \frac{(y+2)^2}{16} = 1$. If S and T are the foci of an ellipse find RS + RT

32. Find the coefficient of x^{-2} in $(3x - \frac{1}{3x})^4$

33. Find the solution set of $\frac{x-3}{x-2} \geq 1$

34. $\int_0^1 x(1-x)^4 dx$

35. Find the domain of $f(x) = 2[\sin^{-1}(2x-1)] - \frac{\pi}{4}$

36. Find the value of $i^{13} + i^{14} + \dots + i^{226}$

37. $\frac{4^{n+1} + 16^{n+1}}{4^n + 16^n} = \text{G.M of 4 and 16}$ find n ?

38. $(3 + 5x)e^y = x$, find $\frac{dy}{dx} =$

39. If the end of a diameter of the circle is $(-4, -2)$, find the other end of the diameter

40. Find x in $4\sin^2 x - 2(1 + \sqrt{3})\sin x + \sqrt{3} = 0, 15^\circ < x < 150^\circ$

41. Find mean deviation about mean of 5, 6, 14, 15

42. $\sin 6^\circ \times \sin 36^\circ \times \sin 60^\circ + \cos 12^\circ \times \sin 42^\circ \times \sin 18^\circ =$

43. If $y = e^{-x^2}$, find $\frac{d^2y}{dx^2} + 2x\frac{dy}{dx} =$

44. If $I = \int_{-1}^1 \frac{x^4}{1-x^4} \cos^{-1}\left(\frac{2x}{1+x^2}\right) dx$ find $2I$

45. If $A = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ and $(\alpha I + \beta A)^2 = A$ find $\alpha^2 - \beta^2$?

46. If $\sin \theta \times \cos \theta > 0$ then θ lies in

47. $\begin{bmatrix} x & 3 & -1 \end{bmatrix} \begin{bmatrix} 1 & 1 & 2 \\ -1 & 0 & 1 \\ 1 & -1 & 1 \end{bmatrix} \begin{bmatrix} x \\ 2 \\ 1 \end{bmatrix} = 0$

48. Solve $(x + 2y)dx + (2x - y)dy = 0$

49. $f(x) = 1 + x \log(x + \sqrt{x^2 + 1}) - \sqrt{x^2 + 1}$, $x \geq 0$ strictly increasing in

50. $\int \left[\frac{1}{(1+x)^2} - \frac{2}{(1+x)^3} \right] e^x dx$

51. Perpendicular drawn from origin to the straight line $\sqrt{3}x + y - 24 = 0$ makes an angle α with positive direction of X - axis then $\alpha =$ _____

52. Which of the following is not true

- 1) $f(x) = x|x|$ differentiable in $(-1, 1)$
 - 2) $g(x) = \sqrt{|x|}$ differentiable in $(4, 5)$
 - 3) $h(x) = |x - 2| + |x - 3|$ differentiable in
 - 4) $k(x) = |x + 1| + |x - 6|$ differentiable in $(-1, 6)$
 - 5) $f(x) = x + [x]$ differentiable in $x =$
-

53. $f(x) = \begin{cases} \frac{2x^2+3x-5}{x-1}, & x \neq 1 \\ k, & x = 1 \end{cases}$ is continuous at $x = 1$, then $k =$
