

KEAM 2026 Engineering April 21

Question Paper (memory based)

Conducted by CEE Kerala



General Instructions

- (**Duration:** The total duration of the examination is 3 hours (180 minutes).
- (**Total Marks:** The complete paper carries a maximum of 600 marks.
- (**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).
- (**Compulsory Questions:** All 150 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 large tank has a small hole at depth of 2m from water surface. What is the velocity of a water flow through hole

2. 10 stones of mass 'm' are arranged one above another in a vertical stack. What is the force

experienced by the 6th stone from the bottom?

3. Find difference between the angular momentum of 5th and 3rd orbit of hydrogen atom

4. 3 cells having emf 3v, 4v and 4v with internal resistance 0.5, 0.75, 0.75 respectively are connected in series with 4Ω as shown in figure. Find current through 4Ω resistor

5. A heat engine operates between source and sink. The sink temperature is 27°C and the efficiency of the engine is 40%. Find the temperature of source.

6. A body initially at rest explodes into two fragments of masses m and $3m$. If total kinetic energy released is E , find the kinetic energy of the fragment of mass m .

7. If a current carrying loop is freely suspended in a magnet; what will happen

8. What is the work done to rotate a dipole from 60° to 90° in a uniform magnetic field B

9. In which of the following potential energy stored is maximum

10. If tube length of telescope is 76cm and magnifying power is 75cm, find f_o and f_e .

11. A person starts to move from origin with a speed of 20km/h from A to B for 2 hour and then moves with the same speed perpendicular to AB for 30 minute what will be the displacement of man

12. The focal length of a concave mirror is 80m and the object is placed 100m from the mirror. What will be the magnification of the image produced.

13. Dimension of k_B is same as

- (A) Force
 - (B) Power
 - (C) Heat Capacity (or Entropy)
 - (D) Momentum
-

14. A block of mass 5kg placed on a horizontal surface of a platform accelerating horizontally with acceleration 3m/s^2 . Find minimum coefficient of static friction required to prevent slipping

15. If gravitational potential energy at a height gravitational potential energy at height 3.6×10^6 m from surface? ($R = 6.4 \times 10^6$ m)

16. In SHM, find the time taken by a particle to move from the mean position to the extreme position

17. If threshold wavelength is $6000 \text{ \AA}$, what is the workfunction

18. If the proton, deuteron and α - particle has same velocity, then

- (A) Their K.E. are equal
 - (B) Proton has larger K.E
 - (C) Duetron has higher K.E
 - (D) α - particle has higher K.E.
-

19. A swimmer is jumping from top of a height to increase the number of spins, he must

20. 2 monoatomic ideal gases A and B contains 10^{24} molecules and 10^{23} molecules and has temperature 300K and 400K respectively. Find the temperature of the mixture [Assume no loss of heat]

21. When Si or Ge atoms are doped with

- 1) Indium is n type
 - 2) Phosphorus is p type
 - 3) Arsenic is n type
 - 4) Gallium is n type
 - 5) Antimony is p type
-

22. A nuclide ${}_{94}^{223}\text{X}$ changes to ${}_b^a\text{Y}$ after emission of 2α and 2β decay. Find a and b

23. The magnetic field due to a solenoid having current 2A and length 2m is 2π Tesla. Find the total number of turns in a solenoid

24. In a YDSE experiment light of red, blue green colours is used separately. Arrange them in increasing order of fringe width

25. A coil of cross sectional area 0.1cm^2 placed in a magnetic field of 0.5T such that its plane is perpendicular to magnetic field. It is rotated so that its plane become parallel to the field in 0.5s . Find induced emf.

26. Find the cross sectional area of wire, if elongation is 1% force $F = 4.5 \times 10^3 \text{ N}$ and $y = 9 \times 10^{11} \text{ N / m}^2$

27. Two particle of masses 4kg and 6kg are in $x - y$ plane at distances 2m and 4m from the origin. Find the moment of inertia about the $z - \text{axis}$

28. deBroglie wavelength of electron is 0.122nm . The accelerating potential is

29. An equipotential surface of two charges A, $-\mu\text{c}$ and B, $+5\mu\text{c}$ perpendicular to the line joining the charges is at what distance from charge A

30. The rate of flow of electrons through three conductors which are connected in parallel are in the ratio $3:2:1$. Calculate the resistance ratio

31. A photon of energy 5.2eV falls on surface of Ni and Mo emits electrons of kinetic energy 1.2eV and 0.5eV respectively. The work functions are.

CHEMISTRY

1. Commercially benzaldehyde is prepared by

- (A) Hydrogenation with Pd in BaSO_4
 - (B) Side chain chlorination followed by hydrolysis
 - (C) Chromyl chloride in acetic acid
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2. Methyl bromide is converted to methyl fluoride AgF . What is the name of the reaction?

3. Increasing order of enthalpy of fusion of C_6H_6 , CH_3COCH_3 , CCl_4

4. Benzene diazonium chloride on treatment with HCl and Cu powder gives chlorobenzene
name of the reaction

5. Which of the following shows lowest ionisation

Be, B, N, O

- (A) Be
 - (B) B
 - (C) N
 - (D) O
-

6. Find the order of the dipole moment of NF_3 , H_2O , CHCl_3 , NH_3

7. Which of the following is a mixed oxide?

- (A) MnO_2
(B) Mn_2O_3
(C) Mn_3O_4
(D) Mn_2O
-

8. Match the following

Milk of Magnesia — 7.8

Milk — 6.8

Egg white — 5

Black coffee — 10

9. Order of dipole moment CHCl_3 , NH_3 , BF_3 , H_2O

10. Find the difference between the angular momentum of Bohr 5th and 3rd orbit

- (A) $\frac{h}{2\pi}$
(B) $\frac{h}{\pi}$
(C) $\frac{4h}{\pi}$
-

11. % of M = 54% , O = 46%

(Atomic mass of oxygen = 16, Atomic mass of M = 27). Find the empirical formula

12. Which of the following has maximum bond enthalpy

- (A) $\text{C}=\text{C}$
(B) $\text{O}=\text{O}$
(C) $\text{N}\equiv\text{N}$
(D) $\text{C}=\text{O}$
-

13. Decreasing order of basic strength

- (A) $\text{C}_6\text{H}_5 - \text{N}(\text{CH}_3)_2$
 - (B) $\text{C}_6\text{H}_5 - \text{NH} - \text{CH}_3$
 - (C) $\text{C}_6\text{H}_5 - \text{NH}_2$
 - (D) $\text{C}_6\text{H}_5 - \text{CH}_2 - \text{NH}_2$
-

14. 2- methyl butan - 2-ol on treatment with Lucas reagent gives

- (A) 2 - chloro - 2 - methyl butane
 - (B) 1 - chloro butane
 - (C) 2 - chloro butane
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15. Vigorous oxidation of n - pentyl benzene gives

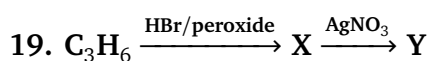
- (A) Benzaldehyde
 - (B) Benzoic acid
-

**16. Order of dehydration of
butan - 2 - ol, butan - 1 - ol, 2 - methylpentan - 2 - ol**

17. Increasing order of λ absorption



18. Molar conductivity acid, HA at 0.1M conc. is $70 \text{ ohm}^{-1}\text{cm}^2\text{mol}^{-1}$. The λ_m° values of H^+ and A^- are 341 and $80 \text{ ohm}^{-1}\text{cm}^2\text{mol}^{-1}$. The degree of dissociation of HA



The product X and Y are

20. In the reaction $A \rightarrow B$ conc. of A is 0.46 mol L^{-1} initially after 10min, conc. A reduced to 0.36 mol L^{-1} . The average rate of reaction.

21. The K_{sp} of AX_2 is 3.2×10^{-14} . The solubility of AX_2 in mol L^{-1} is

22. No. of bond pairs and lone pairs in BrF_3 is

23. $2\text{Cr} + 3\text{Cd}^{2+} \rightarrow 2\text{Cr}^{3+} + 3\text{Cd}$

$E^\circ_{\text{Cd}^{2+}/\text{Cd}} = -0.4\text{V}$. The E°_{cell} is

24. The radius of first Bohr orbit of He^+ is _____

25. Which of the following statement is correct about sucrose

- (A) It is Laevo rotatory
 - (B) It is a reducing sugar
 - (C) It is a disaccharide
 - (D) It is composed of α - D(-) glucose and β -D (+) fructose
-

26. The oxygen tanks used by scuba divers are filled with his diluted with Helium. The % of He is _____

MATHEMATICS

1. If $3(z - i) = 2 - i$, then find the value of $z^2 =$

2. If $\int_a^b x^3 dx = 0$ and $\int_a^b x^2 dx = \frac{2}{3}$. Find a and b

3. $\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right) + \sin^{-1}\left(\frac{1}{2}\right) =$ Find the angle

4. If $2 \tan\left(\frac{\pi}{4} + \theta\right) = 4$ then $\sin 2\theta = ?$

5. $\frac{1}{8!} + \frac{1}{9!} = \frac{x}{12!}$ Find x

6. If $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{5}$ and $P(A \cap B) = \frac{1}{8}$ then find $P(A' | B')$

7. $\int_{\pi/6}^{\pi/3} \frac{1}{\sqrt{1+\tan^2 x}} dx$

8. $i^2 + i^4 + \dots + i^{25} = ?$

9. Find the value of λ if $\begin{bmatrix} 3 & \lambda - 1 \\ 2 & 3 \end{bmatrix} \begin{bmatrix} 3 & -1 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 1 & 2 \end{bmatrix}$

10. If the directrix of the parabola $y^2 - kx + 4 = 0$ is $x - 1 = 0$, then find the value of k .

11. $\frac{2x-1}{2} = \frac{4-y}{4} = \frac{z-3}{3}$, $\frac{x-4}{2} = \frac{y-5}{5} = \frac{z-6}{a}$ these 2 lines are perpendicular then find a

12. $f(x) = \frac{x^2+1}{x^2+1+x}$. Find its domain

13. If 17^{th} and 18^{th} term in the expansion of $(2+x)^{50}$ are equal find the value of x

14. If $y^2 = 369x$. Find the latus rectum

15. $\int e^x \sec x (1 + \tan x) dx$

16. $\lim_{x \rightarrow 0} \frac{\sqrt{1-\cos 2x}}{|x|}$

17. Find the area bounded by $x = y^2$, $x = 0$, $y = 0$, $x = 1$

18. $u = \int e^x \cos x dx$, $V = \int e^x \sin x dx$. Find $u + V$

19. $y = \log \sqrt{\frac{1-x}{1+x}}$. Find $\frac{dy}{dx}$

20. The angle made by the vector $2\hat{i} + \sqrt{3}\hat{j} + 5\hat{k}$ with $\hat{i} \times \hat{j} = ?$

21. $y = (\sin x + e^x)$ find $\frac{d^2x}{dy^2} / \frac{d^2y}{dx^2}$

22. If $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$, $A^{42} = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ Find $a \times d$

23. Find the determinant of inverse of the matrix $\begin{bmatrix} -4 & 5 \\ 2 & 2 \end{bmatrix}$

24. The length of arc is L subtends an angle 45° at the centre of the circle with radius 4cm. Then find L in cm

25. $\int \sin^3 x \cos x \, dx = ?$

26. $2 \tan^{-1} \frac{1}{3} + \cot^{-1} \frac{3}{2} = ?$

27. $\int (e^x + 3^x + x^2) \, dx$

28. $\int_0^{\pi/4} \sqrt{1 + \sin 2x} \, dx$

29. $\lim_{x \rightarrow 3} \frac{x^m - 3^m}{x - 3} = 27$, Find m

30. $\int e^x \left(\frac{1 + \sin x}{1 + \cos x} \right) dx$

31. Length of major axis of an ellipse is 3 times that of minor axis. Calculate eccentricity

32. If radius of a circle is increasing at a rate of 5cm/s. Calculate the rate of increasing in area in cm^2/s . If its radius is 10cm

33. $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ calculate projection of $\vec{a}$ on $\vec{b}$, $\vec{b} = \hat{i} - \hat{j} + \hat{k}$

34. $X = \{(x, y) / 2x^2 + 3y^2 = 35, \text{ where } x \text{ and } y \text{ are integers}\}$. Find number of elements in the set X.
