KEAM 2025 April 26 Question Paper

Time Allowed :3 Hours	**Maximum Marks : 600**	**Total Questions :**150

General Instructions

Read the following instructions very carefully and strictly follow them:

1. This question paper comprises 150 questions.
2. The Paper is divided into three parts- Maths, Physics and Chemistry.
3. There are 45 questions in Physics, 30 questions in Chemistry and 75 questions in Mathematics.
4. For each correct response, candidates are awarded 4 marks, and for each incorrect response, 1 mark is deducted.

1. Evaluate the following expression:

$$\frac{\cos 75^\circ - \cos 15^\circ}{\cos 75^\circ + \cos 15^\circ}$$

(A) 0

(B) $\frac{1}{2}$

(C) 1

(D) -1

---

2. In a linear programming problem (L.P.P.), the corner points of the feasible region are $(5, 0), (10, 0)$ **and** $(4, 1)$. **Find the maximum value of** $Z = 2x + 3y$.

(A) 20

(B) 25

(C) 30

(D) 35

---

3. Evaluate the integral:

$$\int \frac{1}{x(x^4 + 1)}\, dx$$

(A) $\frac{1}{2} \log |x^4 + 1|$

(B) $\frac{1}{x^4+1}$

(C) $\frac{1}{2} \log |x|$

(D) $\frac{1}{x}$

---

4. Evaluate the following expression:

$$\frac{\cos 75^\circ - \cos 15^\circ}{\cos 75^\circ + \cos 15^\circ}$$

(A) 0

(B) $\frac{1}{2}$

(C) 1

(D) -1

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5. In a linear programming problem (L.P.P.), the corner points of the feasible region are $(5,0),(10,0)$ **and** $(4,1)$. **Find the maximum value of** $Z = 2x + 3y$.

(A) 20

(B) 25

(C) 30

(D) 35

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6. Evaluate the integral:

$$\int \frac{1}{x(x^4+1)}\,dx$$

(A) $\frac{1}{2}\log|x^4+1|$

(B) $\frac{1}{x^4+1}$

(C) $\frac{1}{2}\log|x|$

(D) $\frac{1}{x}$

---

7. Evaluate the following integral:

$$\int \frac{\sec x}{(\sec x+\tan x)^2}\,dx$$

(A) $-\frac{1}{\sec x+\tan x}$

(B) $\frac{1}{\sec x+\tan x}$

(C) $-\ln|\sec x+\tan x|$

(D) $\ln|\sec x+\tan x|$

---

8. Evaluate the following integral:

$$\int e^{2\theta}\left(2\cos^2\theta-\sin 2\theta\right)\,d\theta$$

(A) $\frac{e^{2\theta}}{2}\left(2\cos^2\theta-\sin 2\theta\right)$

(B) $e^{2\theta}\cos^2\theta - \frac{1}{2}\sin 2\theta$

(C) $e^{2\theta}(\cos^2\theta - \sin^2\theta)$

(D) $\frac{e^{2\theta}}{2}(\cos^2\theta + \sin^2\theta)$

---

9. Evaluate the following limit:

$$\lim_{\theta\to 0}\frac{\theta\sin 2\theta}{1-\cos 2\theta}$$

(A) 0

(B) 1

(C) 2

(D) 4

---

10. Current in a coil changes at the rate of 10 A/s. The induced emf is 120V. Find the inductance L of the coil.

(A) $12\,\mathrm{H}$

(B) $10\,\mathrm{H}$

(C) $15\,\mathrm{H}$

(D) $18\,\mathrm{H}$

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11. The initial amount of radioactive element in a sample is 6×10^3. After 48 years, the number of radioactive elements becomes 0.75×10^3. Find the half-life.

(A) 24 years

(B) 48 years

(C) 72 years

(D) 96 years

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12. What is the working principle of a Bunsen Burner?

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13 The effective capacitance when n identical capacitors are connected in parallel is 10F, and when connected in series is 0.4F. Find the value of n.

(A) 25

(B) 20

(C) 15

(D) 10

---

14. Find the incorrect pair:

(A) Isobaric - constant pressure

(B) Isochoric - constant volume

(C) Isothermal - constant temperature

(D) Adiabatic - involves heat exchange

---

15. The displacement of a body varies with time t as $S = \frac{1}{2}t^2 - 6t$. Find the time at which the velocity becomes zero.

(A) $1\,\text{s}$

(B) $3\,\text{s}$

(C) $2\,\text{s}$

(D) $4\,\text{s}$

---

16. The effective capacitance when n identical capacitors are connected in parallel is 10F, and when connected in series is 0.4F. Find the value of n.

(A) 25

(B) 20

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18. The displacement of a body varies with time t as $S = \frac{1}{2}t^2 - 6t$. Find the time at which the velocity becomes zero.

(A) $1\,\text{s}$

(B) $3\,\text{s}$

(C) $2\,\text{s}$

(D) $4\,\text{s}$

---

19. Minimum wavelength of Brackett series corresponds to transition from n_1 to n_2, where n_1 and n_2 are respectively...

(A) $4, 3$

(B) $5, 4$

(C) $6, 5$

(D) $7, 6$

---

20. When an electron is accelerated through a 480V, the wavelength is λ. Find the wavelength in terms of λ if it is accelerated through 120V.

(A) $\lambda/2$

(B) 2λ

(C) $\lambda/4$

(D) $\lambda/3$

---

21. The orbital velocity of a satellite is V_0, at a height $h = R$ (where R is the radius of the Earth) from the surface of the Earth. What is the relationship between V_0 and the escape velocity V_e?

(A) $V_0 = \frac{V_e}{2}$

(B) $V_0 = \frac{V_e}{\sqrt{2}}$

(C) $V_0 = \frac{V_e}{4}$

(D) $V_0 = \frac{V_e}{3}$

---

22. Two particles of the same mass have charges in the ratio 3 : 1. What is the ratio of their time periods when they enter a constant magnetic field with the same velocity?

(A) $3 : 1$

(B) $1 : 3$

(C) $9 : 1$

(D) $1 : 9$

---

23. What is the force to be applied on a body of mass 200g to change its velocity by 25 m/s in 5 seconds?

(A) 5 N

(B) 10 N

(C) 20 N

(D) 25 N

---

24. 1 torr =

(A) 1 atm

(B) 1 Pa

(C) 133.322 Pa

(D) 760 Pa

---

25. What is the ratio of distances travelled by a body in the first two intervals of 5 seconds? (Given the initial velocity $u = 1$ m/s and the body moves with a constant acceleration of 5 m/s^2)

(A) 1:2

(B) 1:4

(C) 1:3

(D) 1:1

---

26. A body hanged by a rope in a lift which is moving upward with a constant acceleration of 0.2 m/s^2. The tension in the rope is 80 N. Find the mass of the body.

(A) 10 kg

(B) 20 kg

(C) 40 kg

(D) 80 kg

---

27. If V is the velocity of wave in a rope having tension T, find the velocity when the tension becomes $8T$.

(A) $8V$

(B) $\frac{V}{8}$

(C) $\sqrt{8}V$

(D) V

---

28. A musician hits a drum 90 times in a minute. The time period of hit is:

(A) $\frac{1}{90}$ seconds

(B) $\frac{1}{60}$ seconds

(C) $\frac{1}{5400}$ seconds

(D) $\frac{1}{900}$ seconds

---

29. Chromatic aberration arises in their lens due to:

(A) Difference in the focal length for different wavelengths

(B) Dispersion of light

(C) Diffraction of light

(D) Reflection of light

---

30. If the mean free path of a gas molecule at 27°C is 10×10^{-7} m, then the mean free path at 87°C is:

(A) 10×10^{-6} m

(B) 12×10^{-7} m

(C) 15×10^{-7} m

(D) 8×10^{-7} m

---

31. If an inductor coil of self-inductance 2H stores 25J of magnetic energy, then the current passing through it is:

(A) 5A

(B) 10A

(C) 7A

(D) 12A

---

32. Bernoulli's principle is applicable to:

(A) Fluid flow

(B) Thermodynamics

(C) Electromagnetism

(D) Quantum Mechanics

---

33. If the angular displacement in 10 seconds is $150°$, find the number of revolutions in 10 seconds.

(A) 75

(B) 100

(C) 150

(D) 50

---

34. If P_0 is the atmospheric pressure and P is the pressure at a depth h, find the Guage pressure.

(A) $P - P_0$

(B) $P_0 - P$

(C) $P_0 \times P$

(D) $P \times h$

---

35. A pn junction diode without bias acts as:

(A) Transistor

(B) Resistor

(C) Voltage regulator

(D) AC transformer

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36. A light is incident on a surface having refractive index $\frac{4}{3}$ and reflected light is completely polarised. $\left(\tan 53^\circ = \frac{4}{3}\right)$. What is the angle of incidence?

(A) 53°

(B) 42°

(C) 63°

(D) 30°

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37. A cricmeter hits a ball with an initial velocity of 40 m/s. Calculate the maximum range.

(A) $80\,\text{m}$

(B) $160\,\text{m}$

(C) $200\,\text{m}$

(D) $320\,\text{m}$

---

38. Find R in the following circuit:

(A) $12\,\Omega$

(B) $6\,\Omega$

(C) $3\,\Omega$

(D) $4\,\Omega$

---

39. If $F = 6\pi\eta x,$ find the dimension of x.

(A) $[M^1L^1T^{-1}]$

(B) $[M^0L^0T^1]$

(C) $[M^1L^2T^{-2}]$

(D) $[M^0L^1T^0]$

---

40. If the resistance of a wire is 5 Ω and 6 Ω at 30°C and 40°C respectively, find the temperature coefficient of resistance.

(A) 0.0015 per °C

(B) 0.0030 per °C

(C) 0.0020 per °C

(D) 0.0005 per °C

---

41. Work done to move a charge of 5C from P to Q is 10J. If the potential at P is 0.5V, then the potential at Q is:

(A) 2 V

(B) 1.5 V

(C) 3 V

(D) 4 V

---

42. Two satellites are revolving at a distance of 2.5R and 7.5R from the center of the Earth. Find the ratio of time period of the satellites.

(A) $\frac{1}{3}$

(B) 1

(C) $\frac{1}{9}$

(D) $1 : 2$

---

43. Find the incorrect statement:

- A) Isobaric - constant pressure
- B) Isochoric - constant volume
- C) Isothermal - constant temperature
- D) Adiabatic - involves heat exchange

(A) A

(B) B

(C) C

(D) D

---

44. Which of the following cannot form hydrogen bonding?

- A) Phenol
- B) Diethyl ether
- C) Aniline

(A) A

(B) B

(C) C

(D) None of the above

---

45. Entropy decreases in which of the following reactions?

(A) $\mathrm{Br}_2(l) \rightarrow \mathrm{Br}_2(g)$

(B) $\mathrm{Br}_2(g) \rightarrow \mathrm{Br}_2(l)$

(C) $\mathrm{Br}_2(l) \rightarrow \mathrm{Br}_2(g)$ and $\mathrm{Br}_2(g) \rightarrow \mathrm{Br}_2(l)$

(A) $\mathrm{Br}_2(l) \rightarrow \mathrm{Br}_2(g)$

(B) $\mathrm{Br}_2(g) \rightarrow \mathrm{Br}_2(l)$

(C) Both A and B

(D) None of the above

---

46. How many bridging complexes are there in $[\mathrm{Mg(Co)}_{10}]$?

(A) 3

(B) 2

(C) 1

(D) 0

---

47. In which reaction is Benzyl chloride converted to Benzaldehyde?

(A) Gatterman Koch reaction

(B) Stephan's reaction

(C) Etard reaction

(D) Rosemend reduction

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48. Given the reaction:

$$\mathrm{Cr_2O_7^{2-}} + xe^- + yH^+ \rightarrow 2\mathrm{Cr^{3+}} + zH_2O$$

Find the values of x, y, and z.

(A) $x = 6, y = 14, z = 7$

(B) $x = 3, y = 6, z = 3$

(C) $x = 6, y = 12, z = 6$

(D) $x = 4, y = 8, z = 4$

---

49. Which of the following is an interstitial compound?

(A) $\mathrm{SC_2O_3}$

(B) $\mathrm{Mn_4N}$

(C) $\mathrm{TiCl_4}$

(D) TiN

---

50. Ethanol is made unfit for drinking by adding?

(A) HCl

(B) NaOH

(C) KOH

(D) Methanol

---

51. Which is a Lewis acid?

(A) HCl

(B) $\mathrm{OH^-}$

(C) Co^{3+}

---

52. Phenol is treated with conc. H_2SO_4, and then with conc. HNO_3. The compound A and B are formed.

(A) A is phenol, B is nitrobenzene

(B) A is phenol, B is benzene

(C) A is phenol, B is phenol derivative

(D) A is phenol, B is benzene derivative

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53. IUPAC name of allyl amine?

(A) Propanamine

(B) 2-aminopropene

(C) 3-aminopropene

(D) Butanamine

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54. Find the area between the line $y = x - 1$, $y = 0$, $-2 \leq y \leq 2$.

(A) 6

(B) 8

(C) 4

(D) 10

---

55. Find $\frac{dy}{dx}$ for the equation:

$$y = \cos x \times \sin y$$

(A) $\cos x$

(B) $-\sin x$

(C) $\sin x$

(D) $\cos x \times \cos y$

---

56. In a GP 9, 3, $\frac{1}{3}$, $\frac{1}{9}$, . . . , find the 25th term.

(A) $\frac{1}{3^{24}}$

(B) $\frac{9}{3^{24}}$

(C) $\frac{9}{3^{25}}$

(D) $\frac{1}{3^{25}}$

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57. Evaluate the integral:

$$\int e^{x+\frac{1}{x}} \frac{x^2-1}{x^2}\, dx$$

(A) $e^{x+\frac{1}{x}}$

(B) $e^{x+\frac{1}{x}} \left(\frac{x^2-1}{x^2}\right)$

(C) $\frac{e^{x+\frac{1}{x}}}{x}$

(D) $e^{x+\frac{1}{x}} \left(\ln|x| - 1\right)$

---

58. Find the value of:

$$\sin 75^\circ \times \sin 15^\circ \times \sin 45^\circ$$

(A) $\frac{1}{4}$

(B) $\frac{1}{8}$

(C) $\frac{1}{2}$

(D) $\frac{1}{16}$

---

59. If $\tan^{-1}(x) = \tan^{-1}\left(3 - \frac{\pi}{4}\right)$, **find** x.

(A) $3 - \frac{\pi}{4}$

(B) $\frac{\pi}{4} - 3$

(C) $3 + \frac{\pi}{4}$

(D) $3 - \frac{\pi}{2}$

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60. Find the range of $f(x) = \sqrt{x^2 + 4x + 4}$.

(A) $(-\infty, \infty)$

(B) $[0, \infty)$

(C) $(-2, 2)$

(D) $[2, \infty)$

---

61. Evaluate the integral:

$$\int_0^{\frac{\pi}{2}} \frac{1}{1+\sin x}\, dx$$

(A) $\frac{\pi}{4}$

(B) $\frac{\pi}{2}$

(C) $\frac{1}{2}$

(D) $\frac{\pi}{3}$

---

62. Evaluate the derivative of

$$y = \cos x \times \sin y, \quad \frac{dy}{dx} \text{ at } \left(\frac{\pi}{6}, \frac{\pi}{5}\right)$$

(A) $-\frac{1}{2}$

(B) 0

(C) $\frac{1}{2}$

(D) 1

---

63. If $f(x) = \log 3 - \sin x$, $y = f(f(x))$, **find** $y(0)$.

(A) 2

(B) 0

(C) 1

(D) $\log 3$
