KEAM 2026 Engineering April 17

Question Paper (Memory-Based)

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. In YDSE, when light of wavelength 700nm is used, a fringe width of 0.5mm is obtained. What happens when light of wavelength 500nm is used?

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2. When light containing photon of energy $2h\nu_0$ falls on a metal of work function $h\nu_0$, electrons of velocity v_1 are ejected. When photons of energy $5h\nu_0$ is incident, velocity of electrons ejected

is v_2. What is the ratio $\frac{v_1}{v_2}$?

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3. Consider a convex lens made of material of refractive index $n = \frac{3}{2}$ and radius of curvature R. What is the relation between focal length and radius?

(A) $f = \frac{R}{2}$
(B) $f = \frac{R}{4}$
(C) $f = \frac{R}{3}$
(D) $f = \frac{2R}{3}$

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4. Kinetic energy of a particle of mass 1×10^{31} kg and wavelength 63 nm (where $h = 6.3 \times 10^{-34}$ Js)

(A) 1.56×10^{-3} J
(B) 1.34×10^{-3} J
(C) 1.00×10^{-3} J
(D) 2.46×10^{-3} J

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5. Dimension of Planck's constant is same as that of:

(A) Energy
(B) Linear momentum
(C) Angular momentum
(D) Force

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6. What is the number of significant figures in 420.00040×10^{-3}?

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7. Two metallic spheres of radii 1:2 are connected by a conducting wire. What is the ratio of electric field intensities at their surface?

8. What is the ratio of maximum height attained to the height attained at $t = 1$ s for a projectile of initial velocity u projected at an angle $30°$ with horizontal?

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9. If $r_1 = \frac{c_p}{c_v}$ of a rigid diatomic gas and $r_2 = \frac{c_p}{c_v}$ of a non-rigid diatomic gas, find r_1 and r_2.

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10. If a body travels half of the total distance with velocity of 20 km/hr and other half with velocity of 30 km/hr, find average velocity.

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11. If an open pipe suddenly closed, the frequency of the third harmonic of the closed pipe is 50Hz more than the fundamental frequency of the open pipe. Find the fundamental frequency.

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12. Given mass of neutron $1.0087\,u$, mass of proton $1.0073\,u$, mass of $^4He = 4.0018\,u$, find the binding energy of He.

(A) 27.8 MeV
(B) 28.1 MeV
(C) 29.5 MeV
(D) 30.2 MeV

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13. If I, E and L are the moment of inertia, rotational kinetic energy, and angular momentum respectively, then:

(A) $I = \frac{E}{L}$
(B) $2E = \frac{I}{L}$
(C) $L = \sqrt{2EI}$
(D) $E = L = \frac{L}{I}$

---

14. Kirchhoff's first and second laws are consequence of conservation of —— and —— respectively:

(A) Energy and Charge

(B) Charge and Energy

(C) Angular momentum and energy of capacitance C

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15. Two identical capacitors of capacitance C are connected in series. If the space between the plates of one of the capacitors is filled with a medium of dielectric constant k, what is the effective capacitance?

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16. If the ratio of escape velocities is 3:2 from two different planets A and B of radii in the ratio 2:3, find the ratio of acceleration due to gravity at the surface of A to that at the surface of B.

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17. Find the velocity of wave given by $y = 0.05 \sin\left(\frac{2\pi}{\lambda}(x - 200t)\right)$.

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18. If work function of a metal is 6.6 eV, find the threshold wavelength. Given $h = 6.6 \times 10^{-34}$ J·s.

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19. A circular loop is made from a wire of length 6m. If 2A current passes through the circular loop, what is the magnetic moment of the loop?

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20. A galvanometer of 500 resistance is shunted such that only 4% of the current passes through the galvanometer. Find the shunt resistance.

(A) 12.5

(B) 15

(C) 18

(D) 20

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21. If a body of mass 5 kg has a linear momentum of 4 kgm/s, find the kinetic energy.

(A) 4J

(B) 8J

(C) 16J

(D) 32J

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22. Find the relation between the wavelength of proton and electron, if both particles have the same kinetic energy.

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23. A particle of charge equal to 10 times the charge of electrons revolves in a circle with frequency equal to 10 revolutions per second. Find the magnetic field at the centre of the circular path.

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24. If $I = 2\,\mathbf{A}$, $\phi = 10^{-2}$ Weber, $N = 1000$, calculate the self-inductance.

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25. What should be connected in the circuit to remove ripples in AC?

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26. What should be connected in the circuit to remove ripples in AC:

(A) Capacitor in series with load resistance

(B) Capacitor in parallel with load resistance

(C) Inductor connected in parallel with load resistance

(D) Inductor connected in series with load resistance

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27. Bernoulli's principle is applicable for:

(A) Non-compressible non-viscous fluid having stream line flow

(B) Non-compressible non-viscous fluid having turbulent flow

(C) Compressible viscous fluid having stream line flow

(D) Compressible viscous fluid having turbulent flow

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28. If power = 150 kW, torque = 100 Nm, find the angular velocity ω.

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29. What is the ratio of the longest wavelength in Lyman and Balmer series?

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30. A Carnot engine is working between 400K and 500K. If the output work is 1 kJ, what is the heat absorbed?

(A) 2 kJ

(B) 3 kJ

(C) 4 kJ

(D) 5 kJ

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31. At a certain height h from the surface of Earth, the value of acceleration due to gravity is $\frac{g}{9}$, where g is the acceleration due to gravity at the surface. What is the value of h in terms of the radius of Earth R?

(A) $\frac{R}{2}$

(B) $\frac{R}{3}$

(C) $2R$

(D) $3R$

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32. If a proton is displaced by 5m in an electric field of $50\,\text{N/C}$, what is the work done by the electric field?

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33. A particle of charge equal to 10 times the charge of an electron revolves in a circle with frequency equal to 10 revolutions per second. Find the magnetic field at the centre of the circular path.

---

34. Given $I = 2A$, $\phi = 10^{-2}$ weber, $N = 1000$, calculate the self-inductance.

(A) $0.5\,\text{H}$

(B) $1.0\,\text{H}$

(C) $1.5\,\text{H}$

(D) $2.0\,\text{H}$

---

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37. If $I = 16\,\text{A}$, electron density $n = 5 \times 10^{23}\,\text{m}^{-3}$, and $A = 1 \times 10^{-7}\,\text{m}^2$, find the drift velocity.

38. Transformer core is laminated because:

(A) To reduce eddy current loss

(B) To reduce hysteresis loss

(C) To reduce copper loss

(D) To reduce core loss

---

39. For an elastic collision

(A) both momentum and K.E is conserved

(B) only K.E is conserved

(C) only momentum is conserved

(D) neither momentum nor K.E conserved

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40. Current in a circuit is 0.6 A when an external resistance of $3\,\Omega$ is connected. When the external resistance is changed to $6\,\Omega$, current in the circuit becomes 0.4 A. Find the internal resistance of the cell.

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41. Which of the following statement is correct for EM wave:

(A) Velocity in vacuum is 3×10^6 cm/s

(B) They can travel in vacuum

(C) Energy density of electric field and magnetic field are different

(D) It contains electric field vibration only

(E) It contains magnetic field vibration only

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Chemistry

1. What is the IUPAC name of Mesityl oxide?

(A) 4-methylpent-3-en-2-one

(B) 2,4,6-Trimethylphenylacetone

(C) 2,4,6-Trimethyl-3-penten-2-one

(D) 2,4,6-Trimethyl-3-hexen-2-one

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2. IUPAC name of Element number 105?

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3. What is 1-chlorocyclohexene?

(A) Vinylic Halide

(B) Benzylic Halide

(C) Allylic Halide

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4. Decreasing order basic strength

(A) $NH_3 > CH_3NH_2 > (CH_3)_2NH > (CH_3)_3N$

(B) $(CH_3)NH_2 > CH_3NH_2 > (CH_3)_2NH > NH_3$

(C) $CH_3NH_2 > (CH_3)_2NH > (CH_3)NH_2 > NH_3$

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5. The KE of particle of mass 1×10^{-31} Kg and the de Broglie wavelength 63 nm (h = 6.3×10^{-34})

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6. Which of the following have minimum and maximum threshold energy K, Na, Mg, Li?

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7. Number of CC, CH, C=C in But-2-ene-1-yne respectively

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8. There is 40 % C, 67% H2, find the empirical formula

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9. Energy of $2h\nu_0$ fall on a metal of work function $h\nu_0$ cause velocity of v_1, when $5h\nu_0$ fall velocity ratio of v_1/v_2

(A) $v_1/v_2 = 1/5$
(B) $v_1/v_2 = 5/1$
(C) $v_1/v_2 = 1/25$
(D) $v_1/v_2 = 25/1$

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10. The isomerism shown by the following compound:

$$[Co(CN)_6][Cr(NH_3)_6] \quad [Co(CN)_6][Cr(NH_3)_6]$$

(A) Ionisation isomerism
(B) Coordinate isomerism
(C) Linkage isomerism
(D) Hydrate isomerism

11. $P_4 \rightarrow PH_3 + H_2PO_2$

Oxidation state of phosphorus change from ——— to ——— respectively.

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12. Which 3d series of element has least enthalpy of atomization?

(A) Sc

(B) Mn

(C) V

(D) Cu

(E) Zn

---

13. Ratio of between the maximum wavelength of Lyman and Balmer series.

(A) $\frac{5}{27}$

(B) $\frac{27}{5}$

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

(D) $\frac{36}{5}$

(E) $\frac{5}{36}$

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14. The K_c of the reaction

$$NH_3(g) + O_2(g) \rightleftharpoons 2NO(g)$$

at 1500 K is 0.1. What is the concentration of NO, when the initial concentration of N_2 and O_2 is 0.04 mol?

(A) 1.09×10^{-2} M

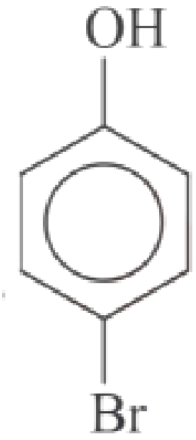
(B) 10.9×10^{-2} M

(C) 2.18×10^{-2} M

(D) 1.09×10^{-4} M

(E) 2.18×10^{-4} M

15. Which reagent gives as major product from phenol



(A) $Br_2 + CS_2$, at 273 K

(B) Br_2 + heat

(C) Bromine water

(D) $Br_2 + CCl_4$ at 273 K

(E) Br_2 + acetone at 273 K

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16. Hinsberg reagent is

(A) p-toluene sulphonyl chloride

(B) Benzene sulphonyl chloride

(C) Phthalimide and KOH

(D) Anhydrous $ZnCl_2$ and conc HCl

(E) Benzoyl chloride and NaOH

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17. If 'm' is the molality, 'M' is the molarity, 'd' is the density in g/cm^3 and 'M_2' is the molarity of solute. What is the relation between them?

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18. Which of the following has highest pKa value?

(A) CH_3COOH

(B) F-CH_2-COOH

(C) $CN\text{-}CH_2\text{-}COOH$

(D) $Cl\text{-}CH_2\text{-}COOH$

(E) $NO_2\text{-}CH_2\text{-}COOH$

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19. Which of the following statements regarding the structure of CO_2 is correct?

(A) CO_2 contains 1 C=O and 1 C=O and one lone pair in each oxygen

(B) CO_2 contains 2 C=O, and 2 lone pairs in each oxygen

(C) CO_2 contains 2 C=O, and 2 lone pairs in each oxygen

(D) CO_2 contains 1 C=O, and 1 C=O and two lone pairs in each oxygen atom

(E) None of these

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20. Which of the following has a planar structure with two lone pairs?

(A) XeF_4

(B) NiF_4

(C) SF_4

(D) SF_6

(E) XeF_4

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21. Lactose is composed of:

(A) α-D glucose and β-D fructose

(B) β-D glucose and β-D galactose

(C) 2 units of α-D glucose

(D) 2 units of β-D glucose

(E) α-D glucose and β-D galactose

---

22. Which of the following is allylic alcohol?

(A) $C_6H_5CH_2OH$

(B) $CH_2 = CH - C(CH_3)_2OH$

(C) $CH_2 - CH_2 - CH_2OH$

(D) $CH_3 - CH_2 - CH_2 - OH$

---

23. Relationship between t_{90} and t_{99} for a first order reaction:

(A) $t_{99} = 3t_{90}$

(B) $t_{99} = 2t_{90}$

(C) $t_{99} = 2.303t_{90}$

(D) $t_{99} = 20.693t_{90}$

(E) $t_{99} = 6.93t_{90}$

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24. Enthalpy of formation of C_6H_6, $CO_2(g)$ and $H_2O(l)$ are -393.5, -285.8 and +48.5 KJ/mol respectively. Find the enthalpy of combustion of C_6H_6:

(A) 3267.4 KJ/mol

(B) 3218.49 KJ/mol

(C) 857.5 KJ/mol

(D) 2361 KJ/mol

(E) 2361 KJ/mol

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25. Increasing order of metallic character

(A) Na > Mg > Be > Si > P

(B) Na > Be > P > Si > Mg

(C) Mg > Be > P > Si > Na

(D) P > Si > Be > Mg > Na

(E) Mg > Si > Be > Na > P

Mathematics

1. (3, 4) and (4, a) lie on line. Find a?

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2. If $y = 4\sqrt{x}$ then $\frac{d^2y}{dx^2} =$

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3. The range of the function $f(x) = \frac{1}{7+4\sin x+3\cos x}$

(A) $\left[\frac{1}{14}, \frac{1}{4}\right]$
(B) $\left[\frac{1}{7}, \frac{1}{3}\right]$
(C) $\left[\frac{1}{3}, \frac{1}{7}\right]$
(D) $\left[\frac{1}{7}, 1\right]$

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4. Number of words that can be formed starting and ending with the same letter from the word BANANA.

(A) 60
(B) 72
(C) 48
(D) 36

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5. Number of ways 3 boys and 4 girls can be arranged such that there is one girl between any 2 boys and one boy between any 2 girls.

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6. If $y = \frac{1+\tan^2 x}{1-\tan^2 x}$, find $y'\left(\frac{\pi}{8}\right)$, where $0 < x < \frac{\pi}{4}$.

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7. If $\alpha = \frac{\pi}{4}$, find $(\sin\alpha + \sin\beta)^2 + (\cos\alpha + \cos\beta)^2$.

8. If $y = \log_e(x^3 + 24)$, find $\frac{dy}{dx}$ at $y = \log_e 2$.

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9. Find $\int_{-1}^{1} \frac{\log(1+|x|)}{1+|x|}\, dx$

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10. Find unit vector parallel to $-(s+4s)\hat{i} + (7-2s)\hat{j} + (3+4s)\hat{k}$

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11. Compute $\int (\cot 2x + \cos 2x)\, dx$

(A) $\frac{1}{2}\ln(\sin 2x) + \frac{1}{2}\sin 2x + C$

(B) $\frac{1}{2}\ln(\sin 2x) + \frac{1}{2}\cos 2x + C$

(C) $\ln(\sin 2x) + \sin 2x + C$

(D) $\ln(\sin 2x) + \cos 2x + C$

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12. Compute $\int \frac{\sqrt{x+1}}{\sqrt{x}}\, dx$

(A) $2\sqrt{x+1} - \sqrt{x} + C$

(B) $2\sqrt{x+1} + \sqrt{x} + C$

(C) $\sqrt{x+1} - \sqrt{x} + C$

(D) $\sqrt{x+1} + \sqrt{x} + C$

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13. Solve $6(2x+3) + x > 53 - 2x$.

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14. Evaluate $\int \frac{x^2+6x+1}{(x+3)^2} dx$.

15. Find α if

$$\lim_{x\to 0}\frac{1-\sec^2(\alpha x)}{\alpha x^2}=-3$$

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16. The distance of the point (10, 10, 10) from the Z-axis.

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17. Find $\int_0^{\frac{\pi}{2}}\sqrt{\cos x\sin 2x}\,dx$

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18. Find minimum value of $\sin x\sin\left(x+\frac{\pi}{3}\right)$

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

(B) 0

(C) 1

(D) $\frac{\sqrt{3}}{2}$

---

19. Find the integral $\int 2\,dy=(y+\cos x)\,dx$

(A) $y=\sin x+C$

(B) $y=\cos x+C$

(C) $y=x+C$

(D) $y=\sin x+\cos x+C$

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20. If the area of the circle $x^2+y^2+8x-6y+c=0$**.**

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21. If $n(B) = 61$, $n(A \cup B) = 99$, $n(A \cap B) = 28$, find $n(A')$.

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22. Given that $\vec{a} = 2\hat{i} - \lambda\hat{j} + 5\hat{k}$, $\vec{b} = \mu\hat{i} + 7\hat{j} + 3\hat{k}$, and the midpoint of $\overrightarrow{AB} = 3\hat{i} + 2\hat{j} + 4\hat{k}$, find $\lambda + \mu$.

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23. If $\alpha^2 - \frac{1}{\alpha^2} = 2$, find $\left(\alpha + \frac{1}{\alpha}\right)^{16}$.

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24. Maximum of $f(x) = \alpha - 4x - x^2$, find α =?

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25. If $(2-x)^9 = a_0 + a_1x + \cdots + a_9x^9$, find $a_1 + a_2 + \cdots + a_8$

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26. Given $y = 4e^{-x} - 2e^{-2x} - e^{-3x}$, find y''.

(A) $4e^{-x} - 4e^{-2x} - 3e^{-3x}$

(B) $4e^{-x} - 2e^{-2x} - 6e^{-3x}$

(C) $4e^{-x} - 2e^{-2x} - 3e^{-3x}$

(D) $4e^{-x} - 2e^{-2x} - 5e^{-3x}$

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27. Given $a_1 + a_2 + a_3 + a_4 = 960$ and $a_4 - 8a = a_1$, find a_1.

(A) 320

(B) 240

(C) 160

(D) 120

28. Evaluate $\lim_{x\to 0} \frac{x-\tan(3x)}{\sin(2x)}$

29. Given $y = \frac{1}{1+\tan x}$**, find** $f^{-1}(x)$**, where** $0 < x < \frac{\pi}{2}$**.**

30. Arithmetic mean Geometric mean of 2 numbers $a \quad b$ **in the ratio 5:3. Find** $\frac{a^2+b^2}{ab}$**.**

31. Find $\int \frac{x\cos 2x}{\cos x - \sin x}\, dx$

32. If 2 vectors $4\hat{i} + \ell\hat{j} - 6\hat{k}$ **and** $-6\hat{i} + 12\hat{j} + 9\hat{k}$ **are collinear, find** ℓ**.**

33. Given the numbers 4, 7, x**, 13, 16, with a mean of 10, find the mean deviation about the mean.**

(A) 2.8

(B) 3.2

(C) 2.5

(D) 3.0

34. Given $(3\cos x - 2\sec x)^2 = 9\cos^2 x + 4\tan^2 x + k$**, find** k**.**

(A) 4

(B) 5

(C) 3

(D) 6

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35. Evaluate $\lim_{x\to 1} \frac{\sqrt{x+3}\cdot\sqrt{x-1}}{x-1}$

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36. The coefficient of x^3 **in** $(2+x)^n$ **is 160. Find the coefficient of** x^6 **in** $(2-x^2)^n$**.**

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37. If $f(x)=x^2-10x$, $g(x)=e^x+5$, **find** $g(2x)-f(g(x))$**.**

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38. Max of $Z=7x+10y$ **subject to** $x+y\geq 3$, $x+2y\geq 4$, $x,y\geq 0$**.**

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39. If $|\mathbf{a}-\mathbf{b}|=\frac{\sqrt{3}}{2}$ **where a and b are unit vectors, find the angle between a and b.**

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40. Find the value of $\cot 10^\circ \times \cot 30^\circ \times \cot 45^\circ \times \cot 60^\circ \times \cot 80^\circ$

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41. If $2\cot^{-1}\left(\frac{4}{3}\right)=\cos^{-1}\left(\frac{x}{5}\right)$, **find** x**.**

(A) 3

(B) 4

(C) 5

(D) 6

---

42. Find the locus of $Z=x+iy$ **satisfying**

$$\frac{\text{Re}(z)}{2+i}+\frac{\text{Im}(z)}{1+2i}=\frac{3}{1-2i}$$

(A) $x^2 + y^2 = 1$

(B) $x^2 + y^2 = 9$

(C) $x^2 + y^2 = 4$

(D) $x^2 + y^2 = 25$

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43. Find the equation of the curve (x, y) if $\cos^{-1}(x-2) = \sin^{-1}(y+1)$.

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44. If the sum of the first two terms of a G.P. is 12 and the third term is 16, find the common ratio r.

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45. If $y = \frac{1}{3\sqrt{x}}\left(\frac{2}{x} - 3\right)$, find the interval in which y is strictly decreasing.

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46. If $Z = 1 + i$ and $Z - 24\overline{Z} = \lambda Z^2$, find λ.
