

MHT CET 2020 Mathematics Memory Based Question Paper PDF

SECTION 1: PHYSICS

1. Two rings of radius 'R' and 'nR' made of same material have the ratio of moment of inertia about an axis passing through its centre and perpendicular to the plane as 1:8. The value of 'n' is (mass per unit length is constant):
- 1) 1
 - 2) 3
 - 3) 4
 - 4) **2**
2. Two wires of same length and material are stretched by same force. If their masses are in the ratio 3:4, then the ratio of their elongations is:
- 1) **4/3**
 - 2) 5/3
 - 3) 1/3
 - 4) 2/3
3. Two open organ pipes of fundamental frequencies n_1 and n_2 are joined in series. The fundamental frequency of the new pipe is:
- 1) $n_1 - n_2$
 - 2) $\frac{n_1 n_2}{n_1 + n_2}$
 - 3) $\frac{1}{n_1 n_2}$
 - 4) $\frac{n_1 + n_2}{n_1 n_2}$
4. An electron is projected along the axis of circular conductor carrying current I. Electron will experience:
- 1) a force at an angle of 30° with the axis.
 - 2) **no force.**
 - 3) a force along the axis.
 - 4) a force perpendicular to the axis.
5. For which logic gate the following statement is true? The output is high if and only if all inputs are high.
- 1) **AND**
 - 2) OR
 - 3) NOR

4) NAND

6. A coil of radius ' r ' is placed on another coil (radius ' R ', current changing) so their centres coincide. ($R \gg r$) If both are coplanar, mutual inductance is proportional to:

- 1) r/R
- 2) R/r
- 3) R/r^2
- 4) r^2/R

7. A ray of light travels Air $\rightarrow$ Water $\rightarrow$ Glass $\rightarrow$ Air. Refractive indices: $W/A = x$, $G/W = y$, $A/G = z$. Which is correct?

- 1) $xz = y$
- 2) $yz = x$
- 3) $xyz = 1$
- 4) $xy = z$

8. The magnetic field due to a short bar magnet at axial point ' r ' is ' B '. If the axis is moved towards the equator along a circular path of radius ' r ', ' B ' will:

- 1) not change.
- 2) go on increasing.
- 3) increase from zero to infinity.
- 4) **go on decreasing.**

9. Two stones (m , $3m$) whirled in circles. Heavier radius (r/n), lighter ' r '. Lighter tangential speed is ' n ' times heavier. Centripetal force is same. $n =$

- 1) 2
- 2) **3**
- 3) 1
- 4) 4

10. Resistance 2000Ω in series with galvanometer ' G ' has range ' V '. To triple its range, 2000Ω is added in series. Value of G is:

- 1) 700Ω
- 2) 900Ω
- 3) 400Ω
- 4) 600Ω

11. Displacement $x = 0.25 \sin(11t + 0.5)m$. The period of S.H.M. is ($\pi = 22/7$):

- 1) $2/7$ s
- 2) $4/7$ s
- 3) $3/7$ s
- 4) $1/7$ s

12. Let inductance be 'L' and resistance 'R'. The dimensions of (L/R) are:

- 1) $[L^1 M^0 T^1]$
- 2) $[L^0 M^0 T^0]$
- 3) $[L^0 M^1 T^0]$
- 4) $[L^0 M^0 T^1]$

13. M.I. of a rod about perpendicular axis at end is 'I'. Rod bent into ring; M.I. about diameter is ' I_1 '. I/I_1 is:

- 1) $8\pi^2/3$
- 2) $11\pi^2/3$
- 3) $4\pi^2/3$
- 4) $\pi^2/3$

14. For a rigid diatomic gas at constant pressure, the ratio $\Delta Q : \Delta U : \Delta W$ is:

- 1) 5 : 7 : 2
- 2) **7 : 5 : 2**
- 3) 2 : 5 : 7
- 4) 5 : 2 : 7

15. A network of 4 capacitors ($C_1 = 2C, C_2 = 2C, C_3 = 3C, C_4 = 4C$). Ratio of charges on C_2 and C_1 is:

- 1) $3/13$
- 2) $3/19$
- 3) $3/17$
- 4) **$3/22$**

16. Which graph correctly represents Einstein's photoelectric equation (K.E. vs Frequency)?

- 1) (C)
- 2) **(A) (Linear with positive intercept)**
- 3) (D)
- 4) (B)

17. A body (rest) acted on by constant force (F) for time (t). K.E. at time t is:

- 1) $F^2 t^2 / m$
- 2) $(Ft/m)^2$
- 3) $Ft/2m$
- 4) $F^2 t^2 / 2m$

18. Find current in circuit with 10V and 200V batteries (opposing) and 38Ω resistor:

- 1) 7.5 A
- 2) **5 A**
- 3) 10 A
- 4) 3 A

19. 1000 small drops combine to form one big drop. Ratio of final to total initial surface energy is:

- 1) 1 : 1000
- 2) 1 : 1
- 3) **1 : 10**
- 4) 1 : 100

20. R.M.S. velocity is C_1 at 27°C . At 327°C , velocity is C_2 . Ratio C_2/C_1 is:

- 1) $\sqrt{2}$
- 2) 2
- 3) 4
- 4) $2\sqrt{2}$

21. In spherical mirrors, images on the side of object and opposite side are:

- 1) virtual and real.
- 2) virtual and virtual.
- 3) real and real.
- 4) **real and virtual.**

22. $\mu = A + B/\lambda^2$. Dimensions of constant B are same as:

- 1) velocity.
- 2) **area.**
- 3) wavelength.
- 4) volume.

23. Cells E_1, E_2 in series: balance length 64 cm. Polarity of E_2 reversed: balance 32 cm. $E_1/E_2 =$:

- 1) 1 : 2
- 2) 2 : 1
- 3) 1 : 3
- 4) **3 : 1**

24. Power radiated from linear antenna is proportional to:

- 1) λ^{-2}
- 2) λ^{-1}
- 3) λ^2
- 4) λ

25. Excess pressure in bubble 1 is twice bubble 2. Ratio of volume V_1/V_2 is:

- 1) 1 : 4
- 2) 1 : 1
- 3) 1 : 2
- 4) **1 : 8**

26. Double slit experiment in water ($\mu = 1.33$). $d = 1\text{mm}$, $D = 1.33\text{m}$, $\lambda = 6300\text{\AA}$. Fringewidth is:

- 1) $6.9 \times 10^{-4} \text{ m}$
- 2) $6.3 \times 10^{-4} \text{ m}$
- 3) $5.8 \times 10^{-4} \text{ m}$
- 4) $8.6 \times 10^{-4} \text{ m}$

27. Angle between two forces of magnitude R , if resultant is $R/2$:

- 1) $\cos^{-1}(-7/8)$
- 2) $\cos^{-1}(-5/7)$
- 3) $\cos^{-1}(-3/7)$
- 4) $\cos^{-1}(-3/4)$

28. Two wires (same tension). First overtone of wire 1 = Second overtone of wire 2. Radius $r_1 = 2r_2$. Ratio $L_1/L_2 =$:

- 1) **1 : 3**
- 2) 1 : 2
- 3) 2 : 1
- 4) 3 : 1

29. If turns in galvanometer coil decrease, resistance:

- 1) may increase or decrease.
- 2) increases.
- 3) remains same.
- 4) **decreases.**

30. Uniform rod (M , L). Case 1: Axis through centre. Case 2: Axis through end. Ratio of radius of gyration k_1/k_2 is:

- 1) 3 : 1
- 2) **1 : 2**
- 3) 2 : 1
- 4) 1 : 3



SECTION 2: CHEMISTRY

1. Cell constant of N/10 KCl at 25°C (conductivity = $0.0112\Omega^{-1}\text{cm}^{-1}$, $R = 55.0\Omega$):

- 1) 0.616 cm^{-1}
- 2) 0.491 cm^{-1}
- 3) 2.0 cm^{-1}
- 4) 0.2 cm^{-1}

2. Which complex is heteroleptic and cationic?

- 1) $[\text{Ni}(\text{CO})_4]$
- 2) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$
- 3) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
- 4) $\text{K}_4[\text{Fe}(\text{CN})_6]$

3. Gas at STP (2 dm^3). At what temp does volume double (constant pressure)?

- 1) 540.15°C
- 2) 400.15°C
- 3) 546.15°C
- 4) 273.15°C

4. Type of overlap in O-H bonds in water:

- 1) $sp^2 - P$
- 2) $sp^3 - s$
- 3) $sp - s$
- 4) $sp^2 - s$

5. Compound causing antidepressant action on CNS:

- 1) **phenelzine**
- 2) penicillin
- 3) chloroxylenol
- 4) terpineol

6. Dehydration of Butan-2-ol requires:

- 1) **60 % conc. H_2SO_4 and 373 K**
- 2) 20 % conc. and 373 K
- 3) 20 % conc. and 363 K
- 4) 95 % conc. and 373 K

7. Correct decreasing order of ionic radii of lanthanoids:

- 1) $Sm > Gd > Ce > Pm$
- 2) $Gd > Pm > Ce > Sm$
- 3) $Ce > Pm > Sm > Gd$
- 4) $Pm > Sm > Ce > Gd$

8. Reagent used for conversion of glucose to glucoxime:

- 1) HCN
- 2) Br_2 water
- 3) **Hydroxylamine**
- 4) dilute Nitric acid

9. Relative rate of SN^1 reaction for $(CH_3)_2CH - Br$:

- 1) 10^6
- 2) Less than 10^{-4}
- 3) 0.02
- 4) **1.0**

10. IUPAC name of mesityl oxide:

- 1) 4-Methylbenzaldehyde
- 2) 2-Bromohexan-3-one
- 3) **4-Methylpent-3-en-2-one**
- 4) 1-Phenylbutan-2-one

11. Product of bauxite ore + NaOH:

- 1) **Sodium meta aluminate**
- 2) Aluminium hydroxide
- 3) Sodium aluminate
- 4) Sodium hydrogen carbonate

12. Symbol of element with atomic number 116:

- 1) Uus
- 2) Uut
- 3) **Uuh**
- 4) Uun

13. Isomeric amine with highest boiling point:

- 1) diethylamine
- 2) **n-butylamine**
- 3) tert-butylamine
- 4) ethyldimethylamine

14. Hybridisation resulting in tetrahedral geometry:

- 1) sp^2
- 2) sp
- 3) sp^3
- 4) dsp^2

15. Reaction sequence: *Ethane* $\xrightarrow{HNO_2, \Delta}$ A $\xrightarrow{LiAlH_4}$ B. B is:

- 1) Ethanoic acid
- 2) Ethanal
- 3) Ethanol
- 4) **Ethanamine**

16. Molar conductivity of $CaCl_2$ ($Ca^{2+} = 119, Cl^- = 71$):

- 1) 431.0
- 2) 341.0
- 3) 261.0
- 4) 126.0

17. Lithium (BCC). Radius if $a = 351$ pm:

- 1) **151.98 pm**
- 2) 300.50 pm
- 3) 75.50 pm
- 4) 240.80 pm

18. Polymer used to make crockeries:

- 1) **Melamine**
- 2) HDPE
- 3) Buna-S
- 4) Buna-N

19. Benzoic acid + conc. H_2SO_4 + conc. $HNO_3 \rightarrow$:

- 1) 2,4,6 trinitrobenzoic acid
- 2) o-Nitrobenzoic acid
- 3) **m-Nitrobenzoic acid**
- 4) p-Nitrobenzoic acid

20. Amino acid with side chain $R = -CH_2OH$:

- 1) Arginine
- 2) Tyrosine
- 3) **Serine**
- 4) Proline

21. $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$. Rate of disappearance $NH_3 = 3.6 \times 10^{-3}$. Rate of H_2O formation:

- 1) 4.0×10^4
- 2) 3.6×10^{-3}
- 3) 6.0×10^{-4}
- 4) 5.4×10^{-3}

22. Osmotic pressure of 1M solution at 27°C ($R=0.082$):

- 1) 2.46 atm
- 2) 12.1 atm
- 3) **24.6 atm**
- 4) 1.21 atm

23. Oxidation state of Cr in $K_3[Cr(C_2O_4)_3]$:

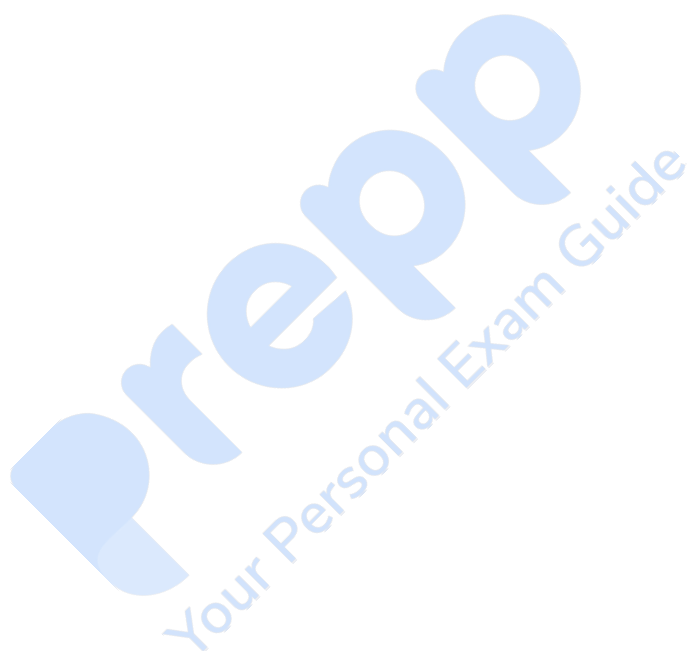
- 1) **+3**
- 2) +2
- 3) +6
- 4) +5

24. Which is a dihydric phenol?

- 1) P-cresol
- 2) Phloroglucinol
- 3) **Catechol**
- 4) Pyrogallol

25. Which halogen does not form polyhalide ion?

- 1) Cl
- 2) Br
- 3) I
- 4) **F**



SECTION 3: MATHEMATICS

1. Area bounded by $y = \log x$, x-axis, $x = 1$, $x = e$:
- 1) $1/e$ sq. units
 - 2) **1 sq. units**
 - 3) 4 sq. units
 - 4) $1/2$ sq. units
2. Acute angle between $3x^2 - 4\sqrt{3}xy + 3y^2 = 0$ is:
- 1) 45°
 - 2) 60°
 - 3) 70°
 - 4) 30°
3. If $s_n = 7(3^n - 1)$, then $t_n =$:
- 1) $(7)3^{n-1}$
 - 2) $(14)3^{n+1}$
 - 3) $(14)3^{n-1}$
 - 4) $(7)3^{n+1}$
4. $F(x) = \sqrt{x}/2$. Find $P[X > 1]$:
- 1) $1/3$
 - 2) $1/\sqrt{2}$
 - 3) **$1/2$**
 - 4) $1/4$
5. $\int x^x(1 + \log x)dx = kx^x + c$. $k =$:
- 1) $\log_e e$
 - 2) $\log_e(1/e^2)$
 - 3) $\log_e(e^2)$
 - 4) $\log_e(1/e)$
6. Particle law $s = t^3 - 6t^2 + 9t + 25$. Displacement when acceleration is zero:
- 1) 0 units
 - 2) -27 units
 - 3) **27 units**
 - 4) 9 units

7. Growth rate 8%. Time to double population ($\log 2 = 0.6912$):
- 1) **8.64 years**
 - 2) 6.8 years
 - 3) 10.27 years
 - 4) 4.3 years
8. If $f(x) = \frac{2x+3}{3x-2}$, then $f \circ f$ is:
- 1) an even function
 - 2) not defined for all x
 - 3) a constant function
 - 4) **an odd function**
9. If $\int_0^1 (5x^2 - 3x + k)dx = 0$, then $k =$:
- 1) $1/3$
 - 2) $1/6$
 - 3) $-1/3$
 - 4) $-1/6$
10. $\int \frac{e^x}{\sqrt{x}}(1 + 2x)dx =$:
- 1) $\frac{1}{\sqrt{x}}e^x + c$
 - 2) $2\sqrt{x}e^x + c$
 - 3) $\frac{\sqrt{x}}{2}e^x + c$
 - 4) $\sqrt{x}e^x + c$
11. $\cos(\frac{3\pi}{4} + x) - \sin(\frac{\pi}{4} - x) =$:
- 1) $-\sqrt{2}\cos x$
 - 2) $-\sqrt{2}\sin x$
 - 3) $\sqrt{2}\cos x$
 - 4) $\sqrt{2}\sin x$
12. $\int_{-\pi}^{\pi} \frac{2x}{1+\cos^2 x} dx =$:
- 1) π
 - 2) **0**
 - 3) 1
 - 4) $-\pi$

13. If $f(x) = [x]^2 - 5[x] + 6 = 0$, then $x \in$:

- 1) $(2, 4]$
- 2, 4
- 2) **$[2, 4)$**
- 3) $(2, 4)$

14. Differential equation with solution $y = c^2 + c/x$:

- 1) $x^4(y')^2 + xy' - y = 0$
- 2) $x^4(y')^2 - xy' - y = 0$
- 3) $x^4(y')^2 - xy' + y = 0$
- 4) $x^4(y')^2 + xy' + y = 0$

15. If $y\sqrt{1-x^2} + x\sqrt{1-y^2} = 1$, then $dy/dx =$:

- 1) $-\sqrt{\frac{1-y^2}{1-x^2}}$
- 2) $-\sqrt{\frac{1-x^2}{1-y^2}}$
- 3) $\sqrt{\frac{1+y^2}{1+x^2}}$
- 4) $\sqrt{\frac{1-x^2}{1-y^2}}$

16. Collinear vectors $(2\hat{i} - q\hat{j} + 3\hat{k})$ and $(4\hat{i} - 5\hat{j} + 6\hat{k})$. Value of q :

- 1) **$5/2$**
- 2) $-5/2$
- 3) $-2/5$
- 4) $2/5$

17. Value of $\frac{[\bar{a}+2\bar{b} \quad \bar{b}+2\bar{c} \quad \bar{c}+2\bar{a}]}{[\bar{a}\bar{b}\bar{c}]}$ for non-coplanar vectors:

- 1) 8
- 2) 3
- 3) **9**
- 4) 6

18. In $\triangle ABC$, $C = 90^\circ$. $\tan^{-1}(\frac{a}{b+c}) + \tan^{-1}(\frac{b}{c+a}) =$:

- 1) $\pi/4$
- 2) $\pi/6$
- 3) **π**

4) $\pi/3$

19. Simplify $[p \wedge (q \vee r)] \vee [\sim r \wedge \sim q \wedge p]$:

1) q

2) $\sim q$

3) $\sim p$

4) p

20. Perpendicular lines $2\hat{i} + \lambda(\hat{i} + 2\hat{j} + m\hat{k})$ and $\hat{i} + \mu(2\hat{i} + \hat{j} + 6\hat{k})$. Value of m :

1) $3/2$

2) $-3/2$

3) $2/3$

4) $-2/3$

21. Volume of tetrahedron with vertices $(-1,2,3)$, $(3,-2,1)$, $(2,1,3)$, $(-1,-2,4)$:

1) **16/3 cu. units**

2) $13/6$ cu. units

3) 16 cu. units

4) $31/6$ cu. units

22. If $\operatorname{cosec}\theta + \cot\theta = 5$, then $\sin\theta =$:

1) $1/5$

2) $5/26$

3) **5/13**

4) $1/13$

23. Max area rectangle from 108m wire. Dimensions:

1) 28 m, 28 m

2) **27 m, 27 m**

3) 25 m, 25 m

4) 26 m, 26 m

24. Eccentricity of $16x^2 - 3y^2 - 32x - 12y - 44 = 0$:

1) $\sqrt{19}/3$

2) $\sqrt{13/19}$

3) $\sqrt{19}/3$

4) $\sqrt{13}/\sqrt{19}$

25. $u = \tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$, $v = \tan^{-1}\left(\frac{2x\sqrt{1-x^2}}{1-2x^2}\right)$. du/dv at $x = 0$:

1) $1/4$

2) $1/8$

3) 1

4) $-1/8$

26. D.C.s of line in ZOX plane at 30° to Z-axis:

1) $0, 1/2, \pm\sqrt{3}/2$

2) $\pm 1/2, 0, \sqrt{3}/2$

3) $0, \sqrt{3}/2, \pm 1/2$

4) $\sqrt{3}/2, 0, \pm 1/2$

27. Curve eq: $y'' = \sin x + e^x$, $y(0) = 3$, $y'(0) = 4$:

1) $y = 4 + 2x + e^x - \sin x$

2) $y = 2 + 3x + e^x - \sin x$

3) $y = 2 + 4x + e^x - \sin x$

4) $y = 4 + 2x + e^x + \sin x$

28. Gen solution $\tan 3x = 1$:

1) $x = n\pi$

2) $x = n(\pi/3) + \pi/12$

3) $x = n\pi + \pi/4$

4) $x = n\pi \pm \pi/4$

29. Matrix A cofactor sum $a_{21}A_{21} + a_{22}A_{22} + a_{23}A_{23}$ is:

1) -26

2) 0

3) -2

4) 26

30. $\int_0^1 \tan^{-1}\left(\frac{2x}{1-x^2}\right)dx =$:

1) $\pi - \log 2$

2) $\pi/2 - \log 2$

3) $\pi + \log 2$

4) $\pi/2 + \log 2$

31. N doubles in 4 hrs. Time to reach 4N:

- 1) 2 hours
- 2) 4 hours
- 3) 6 hours
- 4) **8 hours**

32. Perp distance from (a, b) to $x/a + y/b = 1$:

- 1) $|\frac{\sqrt{a^2+b^2}}{ab}|$
- 2) $|\frac{ab}{\sqrt{a^2+b^2}}|$
- 3) $|\frac{b^2}{\sqrt{a^2+b^2}}|$
- 4) $|\frac{a^2}{\sqrt{a^2+b^2}}|$

33. $f(x) = \frac{81^x - 9^x}{k^x - 1}$ continuous at 0 ($f(0) = 2$). $k =$:

- 1) **3**
- 2) 9
- 3) 2
- 4) 4

34. $\frac{1-\tan \theta}{1+\tan \theta} = \frac{1}{\sqrt{3}}, \theta \in (0, \pi/2)$. $\theta =$:

- 1) $\pi/12$
- 2) $\pi/4$
- 3) $\pi/6$
- 4) $\pi/3$

35. Matrix A (reciprocal of cube roots of unity matrix). Inverse:

- 1) $A^{-1} = I$
- 2) $A^{-1} = A^2$
- 3) $A^{-1} = A$
- 4) A^{-1} **does not exist**

36. $\sin^{-1}(1/2) + \cos^{-1}(\sqrt{3}/2) + \cot^{-1}(-1/\sqrt{3}) =$:

- 1) $2\pi/3$
- 2) π

3) $\pi/6$

4) $\pi/3$

37. $\int \frac{x^2}{(x+1)(x+2)^2} dx =:$

1) $\log|x+1| + \frac{4}{x+2} + c$

2) $\log|x+1| - \frac{4}{x+2} + \frac{3}{(x+2)^2} + c$

3) $\log|x+1| + \frac{1}{x+2} + c$

4) $\log|x+1| - \frac{4}{x+2} - \frac{3}{(x+2)^2} + c$

38. Line $(1, -2, 3) + \lambda(2, 1, 2)$ parallel to plane $\vec{r} \cdot (3, -2, -m) = 5$. $m =:$

1) -2

2) -3

3) **2**

4) 3

39. S.D. of getting even number in 100 die throws:

1) 10

2) **5**

3) 20

4) 15

40. Max $Z = 3x + 5y$, for $x + 4y \leq 24, y \leq 4$:

1) 20

2) 120

3) **72**

4) 44

41. If $P(A) = 2/5, P(B) = 1/4, P(A \cup B) = 1/2$. $P(A' \cup B') =:$

1) $1/2$

2) $1/4$

3) $3/20$

4) **$17/20$**

42. If $y = \tan^{-1}[\sqrt{\frac{1+\cos(x/2)}{1-\cos(x/2)}}]$, then $y' =:$

1) $-1/3$

- 2) $-1/4$
- 3) $1/3$
- 4) $1/4$

43. $f(x) = 1/2$ on $(0, 2)$. $a = P(X < 1/2)$, $b = P(X > 3/2)$. Relation:

- 1) $a - b = 0$
- 2) $2a - b = 0$
- 3) $3a - b = 0$
- 4) $a - 2b = 0$

44. General solution of $y' + \frac{1}{\sqrt{1-x^2}} = 0$:

- 1) $y^2 + 2 \sin^{-1} x = c$
- 2) $x + \sin^{-1} y = c$
- 3) $y + \sin^{-1} x = c$
- 4) $x^2 + 2 \sin^2 y = c$

45. If lines $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z-1}{4}$ and $\frac{x-3}{1} = \frac{y-k}{2} = \frac{z}{1}$ intersect, $k =$:

- 1) $9/2$
- 2) $2/9$
- 3) $-9/2$
- 4) $-2/9$

46. Contrapositive: 'If Raju is courageous, then he will join Indian Army':

- 1) If Raju doesn't join Army, then he is courageous.
- 2) **If Raju doesn't join Army, then he is not courageous.**
- 3) If Raju joins Army, then he is not courageous.
- 4) If Raju joins Army, then he is courageous.

47. Circle radius increases at 7 cm/s. Rate of area increase after 10 mins:

- 1) 1, 84, 800
- 2) 1, 64, 800
- 3) 1, 88, 400
- 4) 1, 68, 400

48. $|m_1 - m_2|$ for $(\sec^2 \theta - \sin^2 \theta)x^2 - 2 \tan \theta xy + \sin^2 \theta y^2 = 0$:

- 1) 1

- 2) **2**
- 3) 3
- 4) 4

49. Planes $2x - 5y + z = 8$ and $2\lambda x - 15y + \lambda z + 6 = 0$ are parallel. $\lambda =$:

- 1) $1/3$
- 2) -3
- 3) 2
- 4) **3**

50. Centre and radius of $x = 4a\left(\frac{1-t^2}{1+t^2}\right), y = \frac{8at}{1+t^2}$:

- 1) (0, 0) and 3a units
- 2) **(0, 0) and 4a units**
- 3) (0, 0) and 2a units
- 4) (0, 0) and a units

