

MHT CET 2020 Mathematics Memory Based Question Paper PDF

1. Two spheres ' S_1 ' and ' S_2 ' have radii ' R ' and ' $3R$ ', temperature ' T ' K and $\frac{T}{3}$ K respectively. If they are coated with a material of same emissivity, the ratio of rate of radiation of ' S_1 ' to ' S_2 ' is (spheres are of the same material):
 - (a) $\frac{E}{6}$
 - (b) $\frac{E}{3}$
 - (c) $\frac{E}{9}$
 - (d) $\frac{E}{12}$
2. In the experiment to determine the internal resistance of a cell (E_1) using potentiometer, the resistance drawn from the resistance box is ' R '. The potential difference across the balancing length of the wire is equal to the terminal potential difference (V) of the cell. The value of internal resistance (r) of the cell is:
 - (a) $R \left(\frac{E_1}{V} + 1 \right)$
 - (b) $R \left(\frac{V}{E_1} - 1 \right)$
 - (c) $R \left(\frac{V}{E_1} + 1 \right)$
 - (d) $R \left(\frac{E_1}{V} - 1 \right)$
3. Seven capacitors each of capacitance $2 \mu\text{F}$ are to be connected to obtain equivalent capacitance of $\left(\frac{10}{11}\right) \mu\text{F}$. Which of the following combinations is possible?
 - (a) 3 in parallel and 4 in series
 - (b) 2 in parallel and 5 in series
 - (c) 5 in parallel and 2 in series
 - (d) 4 in parallel and 3 in series
4. A solid sphere of mass ' M ' and radius ' R ' is rotating about its diameter. A disc of same mass and radius is also rotating about an axis passing through its centre and perpendicular to the plane but angular speed is twice that of the sphere. The ratio of kinetic energy of disc to that of sphere is:
 - (a) 5 : 1
 - (b) 6 : 1
 - (c) 4 : 1
 - (d) 3 : 1

5. Based on the biasing of diodes in circuits (a) and (b), which of the following is true? (Diagrams show: (a) Anode at $-4V$, Cathode at $-3V$; (b) Anode at $0V$, Cathode at $-2V$):
- (a) (a) and (b) both are forward biased
 - (b) (a) forward and (b) reverse biased
 - (c) (a) and (b) both are reverse biased
 - (d) (a) reverse biased and (b) forward biased
6. Two progressive waves $Y_1 = \sin 2\pi \left(\frac{t}{0.4} - \frac{x}{4} \right)$ and $Y_2 = \sin 2\pi \left(\frac{t}{0.4} + \frac{x}{4} \right)$ superpose to form a standing wave. x, Y_1, Y_2 are in SI system. Amplitude of the particle at $x = 0.5$ m is:
- (a) $2\sqrt{2}$ m
 - (b) 2 m
 - (c) $\sqrt{2}$ m
 - (d) $\frac{1}{\sqrt{2}}$ m
7. Earth revolves round the sun in a circular orbit of radius ' R '. The angular momentum of the revolving earth is directly proportional to:
- (a) R^2
 - (b) R^3
 - (c) $\sqrt{R}$
 - (d) R
8. Let the two forces have equal magnitude ' A '. If the magnitude of the resultant is $\frac{2A}{3}$, then the angle between those two forces is:
- (a) $\cos^{-1} \left(+\frac{7}{9} \right)$
 - (b) $\cos^{-1} \left(-\frac{7}{9} \right)$
 - (c) $\cos^{-1} \left(-\frac{5}{9} \right)$
 - (d) $\cos^{-1} \left(+\frac{5}{9} \right)$
9. A graph of magnetic flux (ϕ) vs current (I) shows lines with different slopes for four inductors A, B, C, D. Smaller value of self inductance is for:
- (a) A
 - (b) C
 - (c) B
 - (d) D
10. Which one of the following statements is '**NOT**' the property of light?
- (a) Light involves transportation of energy.
 - (b) Light can travel through vacuum.
 - (c) Light requires material medium for propagation.
 - (d) Light has finite speed.

11. Relative permeability of an iron is 5500, then its magnetic susceptibility will be:
- (a) 5500×10^{-3}
 - (b) 5500×10^3
 - (c) 5499
 - (d) 5501
12. A capacitor is charged by a battery and energy stored is ' U '. Now the battery is removed and the distance between plates is increased to four times. The energy stored becomes:
- (a) $4U$
 - (b) U
 - (c) $3U$
 - (d) $2U$
13. The excess pressure inside a spherical drop of water is three times that of another drop of water. The ratio of their surface area is:
- (a) 3 : 1
 - (b) 6 : 1
 - (c) 1 : 9
 - (d) 1 : 3
14. Two concentric circular coils having radii r_1 and r_2 ($r_2 \ll r_1$) are placed co-axially with centres coinciding. The mutual induction of the arrangement is:
- (a) $\frac{\mu_0 \pi r_2^2}{r_1}$
 - (b) $\frac{\mu_0 \pi r_1^2}{r_2}$
 - (c) $\frac{\mu_0 \pi r_1^2}{2r_2}$
 - (d) $\frac{\mu_0 \pi r_2^2}{2r_1}$
15. If the potential difference used to accelerate electrons is doubled, by what factor does the de-Broglie wavelength associated with the electrons change?
- (a) Wavelength is decreased to $\frac{1}{2}$ times
 - (b) Wavelength is increased to $\frac{1}{2}$ times
 - (c) Wavelength is increased to $\frac{1}{\sqrt{2}}$ times
 - (d) Wavelength is decreased to $\frac{1}{\sqrt{2}}$ times
16. A digital signal used for transmission in communication systems are:
- (a) only of discrete stepwise values.
 - (b) sound and picture signals in television.
 - (c) continuous variations of current or voltage.
 - (d) fundamental sine waves.

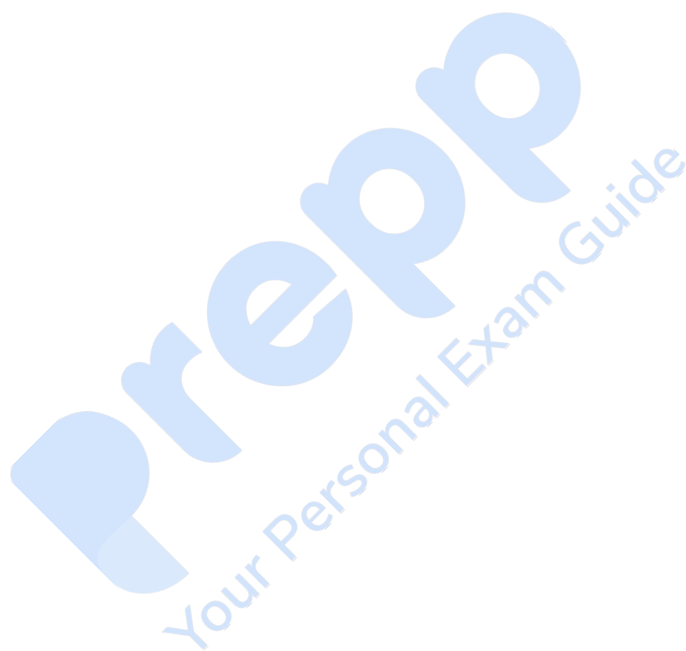
17. In a biprism experiment, the ratio of fringe widths Z_A to Z_B when distance between sources is changed from d_A to d_B is:
- (a) $\left(\frac{d_A}{d_B}\right)^2$
 - (b) $\left(\frac{d_A}{d_B}\right)$
 - (c) $\left(\frac{d_B}{d_A}\right)$
 - (d) $\sqrt{\frac{d_B}{d_A}}$
18. For a parallel beam of monochromatic light of wavelength 5×10^{-7} m incident on a single slit of width 10^{-3} mm, at what angle is the first minima observed?
- (a) $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$
 - (b) $\sin^{-1}(1)$
 - (c) $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$
 - (d) $\sin^{-1}\left(\frac{1}{2}\right)$
19. Two identical thin bar magnets are placed mutually at right angles. The magnitude of resultant magnetic moment of the system is (m = pole strength, l = length):
- (a) $2ml$
 - (b) $\sqrt{2}ml$
 - (c) ml
 - (d) $\sqrt{3}ml$
20. A string of mass 0.1 kg is under tension 1.6 N. Length is 1 m. Time taken by a transverse wave to reach the other end is:
- (a) 0.30 s
 - (b) 0.50 s
 - (c) 0.25 s
 - (d) 0.75 s
21. Water is flowing through a horizontal pipe of non-uniform cross-section. In the region of narrowest part inside the pipe, the water will have:
- (a) maximum velocity and minimum pressure
 - (b) both pressure and velocity maximum
 - (c) both pressure and velocity minimum
 - (d) maximum pressure and minimum velocity
22. A pendulum is oscillating with frequency ' n ' on surface of earth. If taken to depth $\frac{R}{2}$ below surface, new frequency is:
- (a) $\frac{n}{\sqrt{2}}$

- (b) n
(c) $\frac{n}{\sqrt{3}}$
(d) $2n$
23. A stationary wave is formed having 4 nodes along the 120 cm length of the string. The wavelength of the wave is:
(a) 20 cm
(b) 40 cm
(c) 80 cm
(d) 60 cm
24. A block of mass ' m ', kept on a horizontal surface, is moved through a distance ' s ' by applying a horizontal force (F). What is the work done by the normal reaction?
(a) $\frac{F}{s}$
(b) Fs
(c) zero
(d) $\frac{s}{F}$
25. Two small drops of liquid of same radius coalesce to form a big drop. The ratio of total surface energies after and before the change is:
(a) $2^{\frac{1}{3}} : 1$
(b) $2^{-\frac{1}{3}} : 1$
(c) $2^{\frac{2}{3}} : 1$
(d) $2^{-\frac{2}{3}} : 1$
26. A wire carrying current ' I ' along x-axis has length ' l '. It is kept in a magnetic field $\vec{B} = (\hat{i} + 2\hat{j} - 3\hat{k})B$. The magnitude of magnetic force is:
(a) $\sqrt{15}IlB$
(b) $\sqrt{11}IlB$
(c) $\sqrt{13}IlB$
(d) $\sqrt{19}IlB$
27. When the work function of a metal increases, the maximum kinetic energy of emitted photo-electrons:
(a) first decreases and then increases
(b) increases
(c) remains same
(d) decreases
28. For a cyclotron, the oscillator frequency is:
(a) $\frac{qB}{2\pi m}$

- (b) $\frac{qB}{\pi m}$
(c) $\frac{2\pi m}{qB}$
(d) $\frac{qB}{4\pi m}$
29. The period of revolution of a satellite is:
(a) independent of mass of a satellite
(b) independent of radius of planet
(c) dependent on the mass of a satellite
(d) independent of height of the satellite from the planet
30. The errors in measurement of mass and length of a cube are 1.5% and 2.5%. Percentage error in measurement of density is:
(a) 3%
(b) 1.5%
(c) 6%
(d) 9%
31. If only 2% of total current passes through an ammeter having coil resistance ' R ', then resistance of shunt is:
(a) $49R$
(b) $\frac{R}{50}$
(c) $\frac{R}{49}$
(d) $50R$
32. A Diwali cracker releases 25 gram gas per second at 400 m/s. The force exerted by gas is:
(a) 100 dyne
(b) 16 newton
(c) 10 newton
(d) 10,000 dyne
33. A train blowing a whistle moves with constant velocity ' V ' away from an observer. The ratio of natural frequency to apparent frequency is 1.2 : 1. If the train is at rest and observer moves away at velocity ' V ', the ratio of natural to apparent frequency is:
(a) 0.51 : 1
(b) 1.25 : 1
(c) 2.05 : 1
(d) 1.52 : 1
34. A force of 10 N breaks a wire of radius 1 mm. Force required to break a wire of same material but radius 3 mm is:
(a) $\frac{10}{9}$ N

- (b) $\frac{10}{3}$ N
(c) 90 N
(d) 30 N
35. A body performs SHM of amplitude 'A'. At what displacement from mean position is potential energy one-fourth of total energy?
- (a) $\frac{A}{3}$
(b) $\frac{A}{2}$
(c) $\frac{3A}{4}$
(d) $\frac{A}{4}$
36. The sum of magnitudes of two vectors $\vec{A}$ and $\vec{B}$ is 8 and magnitude of resultant is 4. If resultant is perpendicular to one vector, the magnitudes are:
- (a) 3, 5
(b) 2, 6
(c) 4, 4
(d) 1, 7
37. A disc of mass 10 kg and radius 0.1 m rotates at 120 r.p.m. A retarding torque brings it to rest in 10 s. If the torque is due to force applied tangentially on the rim, the magnitude of force is:
- (a) 0.2π N
(b) 0.4π N
(c) 0.8π N
(d) 0.1π N
38. Sustained oscillations in an oscillator are obtained when (where A = gain, β = feedback factor):
- (a) $\frac{A}{\beta} = 1$
(b) $A\beta < 1$
(c) $A\beta = 1$
(d) $A\beta > 1$
39. The susceptibility of tungsten is 6.8×10^{-5} at 300 K. Susceptibility at 400 K is:
- (a) 5.1×10^{-5}
(b) 6.8×10^{-5}
(c) 3.4×10^{-5}
(d) 4.8×10^{-5}
40. One mole of diatomic gas does a work $\frac{Q}{4}$ when amount of heat supplied is 'Q'. In this process, molar heat capacity is:

- (a) $\frac{15R}{4}$
- (b) $\frac{9R}{4}$
- (c) $\frac{7R}{4}$
- (d) $\frac{3R}{4}$



1. What is the formula of calamine?
 - (a) ZnCO_3
 - (b) $\text{MgCO}_3, \text{CaCO}_3$
 - (c) Fe_2O_3
 - (d) FeCO_3
2. Which among the following reagents is used to obtain gluconic acid from glucose?
 - (a) dil. Nitric acid
 - (b) Acetyl chloride
 - (c) Bromine water
 - (d) Acetic anhydride
3. How many optical isomers are possible for a compound having 3 asymmetric carbon atoms?
 - (a) 9
 - (b) 8
 - (c) 3
 - (d) 6
4. Chlorine is manufactured by:
 - (a) Ostwald's process
 - (b) Contact process
 - (c) Haber process
 - (d) Deacon process
5. Hydroxide of which alkali metal is used in the manufacture of soft soap?
 - (a) Caesium
 - (b) Sodium
 - (c) Potassium
 - (d) Lithium
6. A gas has a volume of 3.4 L at 25°C . What is the final temperature if the volume increases to 10.2 L at constant pressure?
 - (a) 1894 K
 - (b) 694 K
 - (c) 894 K
 - (d) 394 K
7. Which of the following is used as promoter in Bosch's process?
 - (a) CO_2
 - (b) CO

- (c) Fe_2O_3
(d) Cr_2O_3
8. Which of the following has highest boiling point?
- (a) 1% urea solution
(b) 1% sucrose
(c) 1% NaCl solution
(d) 1% CaCl_2 solution
9. Heat of reaction for combustion of 1 mole liquid benzene at constant pressure is -3268 kJ/mol . Heat of combustion at constant volume is:
- (a) -3264.2 kJ/mol
(b) -1632 kJ/mol
(c) -6728 kJ/mol
(d) -672.8 kJ/mol
10. Which free radical is most stable among the following?
- (a) $R - \dot{\text{C}}\text{H}_2$
(b) $R_3 - \dot{\text{C}}$
(c) $\dot{\text{C}}\text{H}_3$
(d) $R_2 - \dot{\text{C}}\text{H}$
11. Identify product B: Acetanilide $\xrightarrow{\text{conc. HNO}_3, \text{H}_2\text{SO}_4}$ A $\xrightarrow{\text{H}^+/\text{OH}^-}$ B
- (a) P-nitroaniline
(b) O-nitroacetanilide
(c) Aniline
(d) Nitrobenzene
12. What is the oxidation state of As in H_3AsO_4 ?
- (a) +3
(b) +5
(c) -3
(d) -1
13. Which among the following monomers is used to prepare Teflon?
- (a) $\text{CH}_2 = \text{CH}(\text{CH}_3)$
(b) $\text{CF}_2 = \text{CF}_2$
(c) $\text{CH}_2 = \text{CHCl}$
(d) $\text{CH}_2 = \text{CH}-\text{CH} = \text{CH}_2$
14. Concentrated H_2SO_4 reacts with PCl_5 to produce:

- (a) HClO_2
(b) SO_2Cl_2
(c) SOCl_2
(d) HClO_4
15. Which among the following lanthanoids has smallest atomic size?
(a) Pr
(b) Ce
(c) Sm
(d) Pm
16. Mole fraction of solute in 2 molal aqueous solution is:
(a) 28.775
(b) 0.034
(c) 0.054
(d) 0.018
17. The H-N-H bond angle in NH_3 molecule is:
(a) 101°
(b) 90°
(c) $109^\circ 28'$
(d) $107^\circ 18'$
18. Which following complex is homoleptic and cationic in nature?
(a) $[\text{CoCl}_2(\text{en})_2]\text{Cl}$
(b) $[\text{Fe}(\text{H}_2\text{O})_6]\text{Cl}_3$
(c) $\text{K}[\text{Ag}(\text{CN})_2]$
(d) $[\text{Fe}(\text{CO})_5]$
19. Which among the following elements/complexes does **NOT** represent chemical twins?
(a) Nb - Ta
(b) Zr - Rf
(c) Mo - W
(d) Tc - Re
20. Which among the following is used as a fumigant pesticide for strawberries?
(a) CCl_2F_2
(b) CH_2Cl_2
(c) CCl_3F
(d) CCl_4

21. In an isothermal and reversible process, 1.6×10^{-2} kg O_2 expands from 10 dm^3 to 100 dm^3 at 300K. Work done is:
- (a) -1436 J
 - (b) -5744 J
 - (c) -4308 J
 - (d) -2872 J
22. Identify mineral of aluminium:
- (a) Diaspore
 - (b) Limonite
 - (c) Azurite
 - (d) Chalcopyrite
23. Basic strength order of alkylamine in aqueous phase is:
- (a) $(CH_3)NH_2 > (CH_3)_2NH > (CH_3)_3N > NH_3$
 - (b) $(CH_3)_2NH > (CH_3)_3N > CH_3NH_2 > NH_3$
 - (c) $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2 > NH_3$
 - (d) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N > NH_3$
24. Identify product C: $CH_3CH_2COOH \xrightarrow{NaOH} A \xrightarrow{NaOH, CaO, \Delta} B \xrightarrow{HNO_3, \Delta} C$
- (a) $CH_3CH_2CH_3$
 - (b) $CH_2 = CH_2$
 - (c) $CH_3CH_2NO_2$
 - (d) $CH_3CH_2CH_2OH$

25. The cartesian coordinates of the point whose polar coordinates are $(\frac{1}{2}, 120^\circ)$ are:
- (a) $(\frac{1}{4}, \frac{-\sqrt{3}}{4})$
 - (b) $(\frac{1}{4}, \frac{\sqrt{3}}{4})$
 - (c) $(\frac{-1}{4}, \frac{-\sqrt{3}}{4})$
 - (d) $(\frac{-1}{4}, \frac{\sqrt{3}}{4})$
26. If the population grows at the rate of 5% per year, then the time taken for the population to become double is (Given $\log 2 = 0.6931$):
- (a) 13.624 years
 - (b) 13.8240 years
 - (c) 13.725 years
 - (d) 13.8275 years
27. The particular solution of the differential equation $x dy + 2y dx = 0$, when $x = 2$ and $y = 1$ is:
- (a) $xy^2 = 4$
 - (b) $x^2y = 4$
 - (c) $x^2y = -4$
 - (d) $xy^2 = -4$
28. If $\tan \theta = 2$ and θ lies in the third quadrant, then the value of $\sec \theta$ is:
- (a) $-\sqrt{5}$
 - (b) $\sqrt{3}$
 - (c) $-\sqrt{2}$
 - (d) $\sqrt{5}$
29. The foot of the perpendicular drawn from the origin to the plane $x + y + 3z - 4 = 0$ is:
- (a) $(\frac{2}{11}, \frac{2}{11}, \frac{9}{11})$
 - (b) $(\frac{4}{11}, \frac{4}{11}, \frac{12}{11})$
 - (c) $(\frac{1}{7}, \frac{1}{7}, \frac{6}{7})$
 - (d) $(\frac{1}{5}, \frac{1}{5}, \frac{3}{5})$
30. If $y = \tan^{-1} \left(\frac{\sin 2x}{1 + \cos 2x} \right)$, then $\frac{dy}{dx} =$:
- (a) 1
 - (b) 0
 - (c) -1
 - (d) 2

31. If $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$, then $A^4 A^{-1} =$:

(a) $\begin{bmatrix} 8 & 0 & 0 \\ 0 & -8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

(b) $\begin{bmatrix} 8 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

(c) $\begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & -\frac{1}{2} & 0 \\ 0 & 0 & -1 \end{bmatrix}$

(d) $\begin{bmatrix} -4 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

32. If the lines $\frac{x-1}{5} = \frac{y+1}{3} = \frac{z}{2}$ and $\frac{x+1}{4} = \frac{1-3y}{15} = z+1$ are perpendicular to each other, then $\lambda =$:

(a) 2

(b) 3

(c) 5

(d) 4

33. The general solution of $\tan \theta + \tan 2\theta = \tan 3\theta$ is:

(a) $\theta = (2n+1)\frac{\pi}{2}$

(b) $\theta = n\pi$ or $\theta = \frac{p\pi}{3}$

(c) $\theta = \frac{n\pi}{5}$

(d) $\theta = (2n-1)\frac{\pi}{3}$

34. $\int_0^{\pi/4} \frac{\sin x + \cos x}{9+16 \sin 2x} dx = k \log 3$, then $k =$:

(a) $\frac{1}{30}$

(b) $\frac{1}{20}$

(c) $\frac{1}{10}$

(d) $\frac{1}{40}$

35. The symbolic form of a circuit with two switches s_1, s_2 in series, parallel to a branch containing s_1' and another branch with s_1, s_2, s_3 is:

(a) $(p \vee q) \wedge [\sim p \vee (\sim q \wedge p \wedge r)] \equiv l$

(b) $[(p \vee q) \wedge \sim p] \vee [\sim p \vee q \vee r] \equiv l$

(c) $(p \wedge q) \vee [\sim p \wedge (\sim q \vee p \vee r)] \equiv l$

- (d) $(p \wedge q) \vee \sim p \vee [\sim p \vee p \vee r] \equiv l$
36. If $A = \{x/x \text{ is a prime number}, 0 \leq x \leq 9\}$, then the number of elements of power set of A is:
- (a) 12
(b) 4
(c) 16
(d) 8
37. If the equation $ax^2 + by^2 + cx + cy = 0$ represents a pair of lines, then:
- (a) $a + c = 0$
(b) $a + b = 0$
(c) $a - c = 0$
(d) $a - b = 0$
38. The adjoint of the matrix $A = \begin{bmatrix} 2 & -3 \\ 3 & 5 \end{bmatrix}$ is:
- (a) $\begin{bmatrix} 5 & 3 \\ -3 & 2 \end{bmatrix}$
(b) $\begin{bmatrix} 5 & -3 \\ 3 & 2 \end{bmatrix}$
(c) $\frac{1}{19} \begin{bmatrix} 5 & 3 \\ -3 & 2 \end{bmatrix}$
(d) $\frac{1}{19} \begin{bmatrix} 5 & -3 \\ 3 & 2 \end{bmatrix}$
39. If the equation $ax^2 + hxy + by^2 = 0$ represents a pair of coincident lines, then:
- (a) $h^2 = 2ab$
(b) $h^2 = 4ab$
(c) $h^2 = 8ab$
(d) $h^2 = ab$
40. For $\theta \in (0, \pi/2)$, $\tan 3\theta \cdot \tan 2\theta + \tan 2\theta + \tan \theta = 1$, then $\theta =$:
- (a) $\pi/12$
(b) $\pi/4$
(c) $\pi/6$
(d) $\pi/3$
41. $\int_1^2 x^3 \cdot e^{x^2} dx =$:
- (a) $\frac{1}{2}e^{x^2}(x^2 + 1) + c$

- (b) $\frac{1}{2}e^{x^2}(x^2 - 1) + c$
(c) $\frac{1}{2}e^x(x^2 - 1) + c$
(d) $\frac{1}{2}e^x(x^2 + 1) + c$
42. The approximate value of $\cot^{-1}(1.001)$ is:
(a) $\frac{\pi}{4} - 0.0005$
(b) $\frac{\pi}{4} + 0.005$
(c) $\frac{\pi}{4} + 0.0005$
(d) $\frac{\pi}{4} - 0.005$
43. If the line $6x - y - 4 = 0$ touches the curve $y^2 = ax^3 + b$ at the point $(1, 2)$ then $a + b =$:
(a) 8
(b) -4
(c) 4
(d) 12
44. If $\vec{a} = 2\hat{i} + 3\hat{j} - \hat{k}$, $\vec{b} = -\hat{i} + 2\hat{j} - 4\hat{k}$ and $\vec{c} = \hat{i} + \hat{j} + \hat{k}$, then $(\vec{a} \times \vec{b}) \cdot (\vec{a} \times \vec{c}) =$:
(a) -74
(b) 64
(c) -64
(d) 74
45. If the vectors $\hat{i} + 2\hat{j} + x\hat{k}$ and $y\hat{i} + 6\hat{j} + 4\hat{k}$ are collinear, then the values of x and y are:
(a) $\frac{4}{3}, 3$
(b) 3, 4
(c) $\frac{1}{3}, 1$
(d) 4, 3
46. The focal distance of the point $(4, 4)$ on the parabola with vertex at $(0, 0)$ and symmetric about y-axis is:
(a) 4
(b) 5
(c) $5\sqrt{2}$
(d) $4\sqrt{2}$
47. The maximum value of the function $f(x) = \frac{\log x}{x}$ is:
(a) e^2
(b) $\frac{1}{e}$
(c) $\frac{1}{e^2}$
(d) e

48. If for the harmonic progression, $t_7 = \frac{1}{10}$, $t_{12} = \frac{1}{25}$, then $t_{20} =$:

- (a) $\frac{1}{48}$
- (b) 49
- (c) $\frac{1}{49}$
- (d) 48

49. The area of the region bounded by the curve $y = 4x - x^2$ and the x-axis is:

- (a) $\frac{16}{3}$ sq. units
- (b) $\frac{32}{3}$ sq. units
- (c) 32 sq. units
- (d) 16 sq. units

