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MHT-CET Model Question Paper- Mathematics

Q.1) If vectors $\bar{\imath} + \bar{\jmath} + \bar{k}$, $\bar{\imath} - \bar{\jmath} + \bar{k}$ and $2\bar{\imath} + 3\bar{\jmath} + \lambda\,\bar{k}$ are coplanar then λ =

a) -2 b) 2 c) 3 d) -3

Q.2) Three coins are tossed then the probability that at least two heads appears on upper face is

a) $^5/_8$ -2 b) $^1/_2$ c) $^2/_3$ d) none

Q.3) Equation of a circle passing through the origin and making intercept by the line 4x +3y = 12 with the co-ordinate axes is

a) $x^2 + y^2 + 3x + 4y = 0$ b) $x^2 + y^2 + 3x - 4y = 0$

c) $x^2 + y^2 = 3x + 4y = 0$ d) $x^2 + y^2 - 3x - 4y = 0$

Q.4) If $|\bar{a}| = 1$, and $\bar{a} \perp \bar{b}$ $(\bar{a} + 3\,\bar{b}).(2\,\bar{a} - \bar{b}) = -10$ then $|\bar{b}|$ =

a) 1 b) 2 c) 3 d) 4

Q.5) If $f^1(x) = \frac{x^2}{3} + kx + 1$ and f(0) = 0, f(3) = 15 then f(x) =

a) $\frac{x^3}{9} + x^2 + x$ b) $\frac{x^3}{9} - x^2 + x$

c) $\frac{x^3}{9} + x^2 - x$ d) $\frac{x^3}{9} - x^2 - x$

Quality Assurance

Nagpur Institute of Technology has established Planning Cell to enhance the academic standard of the institute. This is a unique feature of the institute. The cell has been responsible to enhance the academic standard as:
Members of Board of Management, Principal and all HODs are the members of the cell.
Various procedures are developed under Quality Management System to attain the quality standards such as:

- Lesson plan/schedule and Lab Schedule based on Academic Calendar.
- Attendance monitoring
- Remedial teaching
- Continuous assessment through Assignments, Class Tests, Mid Term Test, Pre University Exams etc.
- Continuous improvement of the staff through feedback by the students
- Continuous improvement of the institute services through feedback by the students
- Self appraisal system of staff
- Internal and External Quality Audits at regular intervals
- Well planned scheme to appraise teacher, non-teaching staff.

Q.6) the differential equation for y = a sin (w x + c) where w is the angular velocity is

a) $\frac{d^2y}{dx^2} - y = 0$ b) $\frac{d^2y}{dx^2} + y = 0$

c) $\frac{d^2y}{dx^2} - w^2y = 0$ d) $\frac{d^2y}{dx^2} - w^2y = 0$

Q.7) The particular solution of the differential equation $\frac{dy}{dx} = 3^{x+y}$ when x= y = 0 is

a) $3^x + 3^y = 2$ b) $3^x + 3^{-y} = 2$

c) $3^x - 3^y = 2$ d) $3^x - 3^{-y} = 2$

Q.8) Which of the following is not a statement.

a) Roses are red

b) Mumbai is the capital of India.

c) Every rhombus has equal sides

d) Oh ! how beautiful she is

Q.9) the equation of tangent to the hyperbola $2x^2 - 3y^2 = 5$ at (-2 ,1) on it is

a) 4x – 3y – 5 = 0 b) 4x – 3y + 5 = 0

c) 4x + 3y – 5 = 0 d) 4x + 3y + 5 = 0

Q.10) If $y = \log\left[\sqrt{\frac{1+\cos x}{1-\cos x}}\right]$ then $\frac{dy}{dx}$ =

a) sec x b) – sec x

b) cosec x d) – cosec x

Q.11) The distance between the directrices of an ellipse $3x^2 + 4y^2 = 12$ is

a) 16 b) 8 c) 4 d) 2

Q.12) If f is continuous at x = 2 where

f(x)= 3x – 4 for $0 \leq x \leq 2$

$= 2x + \lambda$ for $2 < x \leq 3$ then $\lambda =$

a) -2 b) -1 c) 0 d) 2

Q.13) If y = 2 at , $x = at^2$ then $xy \frac{d^2y}{dx^2} =$

a) a b) 2a c) –a d) -2a

Q.14) the probability that a company executive will travel by train is $\frac{2}{3}$ and that he will travel by a plane is $\frac{1}{5}$. The probability of his travelling by train or plane is

a) $\frac{2}{15}$ b) $\frac{13}{15}$ c) $\frac{15}{13}$ d) $\frac{15}{2}$

Q.15) $\int \frac{1-\cot x}{1+\cot x}\, dx =$

a) - log |sin x + cos x| +c

b) log |sin x + cos x| +c

c) - log |sin x – cos x| +c

d) log |sin x – cos x| +c

Q.16) $\int_0^{\pi/2} \sqrt{1-\cos 2x}\, dx =$

a) 1 b) 0 c) $\sqrt{2}$ d) $-\sqrt{2}$

Q.17) The volume of the sphere of radius 3 is

a) 36π b) 32π c) π d) 4π

Q.18) The differential equation of all circles having centres on the x-axis and radius unity is

a) $y^2 \frac{d^2y}{dx^2} + y^2 = 1$ b) $y \frac{d^2y}{dx^2} + y = 1$

c) $y^2\left[\frac{dy}{dx}\right]^2 + y^2 = 1$ d) $y^2\left[\frac{dy}{dx}\right]^2 + y^2 = 0$

Q.19) $\int_0^1 x^2\,dx$ by dividing the interval [0 ,1] into 5 equal subintervals using trapezoidal rule is

a) 3.4 b) 0.34 c) 0.32 d) 0.36

Q.20) The line y = x + a$\sqrt{2}$ touches the circle $x^2 + y^2 = a^2$ at the point

a) $\left[\frac{a}{\sqrt{2}}, \frac{a}{\sqrt{2}}\right]$ b) $\left[\frac{-a}{\sqrt{2}}, \frac{-a}{\sqrt{2}}\right]$

c) $\left[\frac{a}{\sqrt{2}}, \frac{-a}{\sqrt{2}}\right]$ d) $\left[\frac{-a}{\sqrt{2}}, \frac{a}{\sqrt{2}}\right]$

Q.21) y = log (5x +1) then y_n =

a) $\frac{(-1)^{n-1}(n-1)!5^n}{(5x+1)^{n-1}}$ b) $\frac{(-1)^{n-1}(n-1)!5^n}{(5x+1)^n}$

c) $\frac{(-1)^{n-1}(n-1)!5^{n-1}}{(5x+1)^n}$ d) $\frac{(-1)^{n-1}\,5^n}{(5x+1)^{n-1}}$

Q.22) The value of $\int \frac{dx}{\sqrt{2x-x^2}}$ =

a) $\sin^{-1}(x-1)+c$ a) $\sin^{-1}(x+1)+c$

c) $-\sqrt{2x-x^2}+c$ d) sin (x+1) +c

Q.23) The equation of the ellipse in the form of $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ given the eccentricity $\frac{2}{3}$ and latus rectum $\frac{2}{3}$ is

a) 25 x^2 + 45 y^2 = 9 b) 25 x^2 - 4 y^2 = 9

c) 25 x^2 - 45 y^2 = -9 d) 25 x^2 + 4 y^2 = 1

Q.24) x + (y.z) = (x +y) this property , in Boolean Algebra is called

a) Associative law b) Distributive law

c) Complement law d) Closure property

Q.25) If B is a Boolean Algebra and for all x,y ∈ B then $(x+y)^1$ =

a) $x^1.y^1$ b) x^1+y^1

c) $(x.y)^1$ d) none

Q.26) If p : A man is happy

q : a man is rich

Then the Statement " If a ,an is not happy then he is not rich " is written as

a) $\sim p \rightarrow \sim q$ b) $\sim q \rightarrow \sim p$

c) $\sim q \rightarrow p$ d) $q \rightarrow \sim p$

Q.27) The Shaded region for the inequality x+ 5y < 6 is

a) to the non – origin side of x + 5y = 6

b) to the origin side of x + 5y = 6

c) to the either side of x + 5y = 6

d) to the neither side of x + 5y = 6

Q.28) Three Students A,B,C solve a problem independently. the probabilities of solving the problems by each of them correctly are $\frac{1}{2}, \frac{1}{3}, \frac{1}{5}$ respectivly Then the probability that the at least one of them solves the problem is

a) $\frac{1}{30}$ b) $\frac{29}{30}$ c) $\frac{4}{15}$ d) $\frac{11}{15}$

Q.29) I is the incentre of ΔABC then I is

a) $\frac{a\bar{a}+b\bar{b}+c\bar{c}}{a+b+c}$ b) $\frac{1}{3}(\bar{a}+\bar{b}+\bar{c})$

c) $\frac{\bar{a}+\bar{b}+\bar{c}}{a+b+c}$ d) $\frac{a\bar{a}+b\bar{b}+c\bar{c}}{\sqrt{a^2+b^2+c^2}}$

Q.30) The value of $\lim_{x\to 1}\left[\frac{\log_e x}{x-1}\right]$ is

a) 0 b) 1 c) 2 d) -1

Q.31) If $y = \log\left[\frac{x+\sqrt{x^2+a^2}}{-x+\sqrt{x^2+a^2}}\right]$ then $\frac{dy}{dx} =$

a) $\frac{-2}{\sqrt{x^2+a^2}}$ b) $\frac{-2}{x+\sqrt{x^2+a^2}}$

c) $\frac{2}{\sqrt{x^2+a^2}}$ d) $\frac{2}{x+\sqrt{x^2+a^2}}$

Q.32) If $\frac{x^2}{\sin^{-1}(sina^2)} - \frac{y^2}{\cos^{-1}(\cos b^2)} = 1$ then $\frac{dy}{dx} =$

a) $\frac{b^2x}{a^2y}$ b) $\frac{-b^2x}{a^2y}$ c) $\frac{x}{y}$ d) $\frac{-x}{y}$

Q.33) Taking h = 1 $\Delta^2\left(\frac{1}{x}\right) =$

a) $\frac{-1}{x(x+1)(x+2)}$ b) $\frac{1}{x(x+1)(x+2)}$

c) $\frac{-2}{x(x+1)(x+2)}$ d) $\frac{2}{x(x+1)(x+2)}$

Q.34) If x +y = 2 then $x^3.y$ is maximum at point

a) $\left(\frac{3}{2},\frac{1}{2}\right)$ b) $\left(\frac{1}{2},\frac{3}{2}\right)$

c) $\left(\frac{2}{3},\frac{1}{2}\right)$ d) $\left(\frac{1}{2},\frac{2}{3}\right)$

Q.35) The function f(x) = log x

a) has maximum at x = e

b) has minima at x = e

c) has neither maxima nor minima

d) all of these

Q.36) $f(3) + \Delta f(2) + \Delta^2 f(1) + \Delta^3 f(1) =$

a) f(2) b) f(4) c) f(5) d) f(6)

Q.37) A plane parallel to $2x-3y+5z+1 = 0$ and passing through (1,2,3) is

a) $2x - 3y + 5z - 11 = 0$ b) $x + 2y + 3z - 11 = 0$

c) $2x - 3y + 5z + 11 = 0$ d) none

Q.38) The equation of the plane passing through (1 ,-2,1) and perpendicular to the line joining (2,5,-1) and (1,0,5) is

a) $x + 5y - 6z$ b) $x + 5y - 6z + 15 = 0$

c) $x - 5y + 6z = 15$ d) $x + 5y + 6z + 15 = 0$

Q.39) The do's of line which is perpendicular to the lines with drs 4,1,3 and 2,-3,1

a) $\frac{5}{\sqrt{75}}, \frac{1}{\sqrt{75}}, \frac{-7}{\sqrt{75}}$ b) $\frac{-5}{\sqrt{75}}, \frac{1}{\sqrt{75}}, \frac{-7}{\sqrt{75}}$

c) $\frac{5}{\sqrt{75}}, \frac{-1}{\sqrt{75}}, \frac{7}{\sqrt{75}}$ d) none

Q.40) The acute angle between the planes $2x - y + z = 6$ and $x + y + 2z + 3$ is

a) 30^0 b) 60^0 c) 90^0 d) 120^0

Q.41) The minimum value of $z = 20x + 30y$ subject to $3x+2y \geq 12$, $4x + y \geq 8$, $x \geq 0 y \geq 0$ is

a) 80 b) 60 c) 100 d) 20

Q.42) $\lim_{x\to 0} \frac{e^x+e^{-x}-2}{cos2x-cos4x} =$

a) 1 b) 6 c) - 6 d) $\frac{1}{6}$

Q.43) If P (not A) = 0.7 , P(B) = 0,7 and $P(B/A) = 0.5$ then $P(A/B)$=

a) $\frac{3}{14}$ b) $\frac{4}{14}$ c) $\frac{1}{2}$ d) $\frac{5}{14}$

Q.44) The matrix x such that

$$X \begin{bmatrix} 5 & -1 & 2 \\ 1 & 3 & 0 \\ 2 & 4 & 1 \end{bmatrix} = \begin{bmatrix} 2 & 4 & 1 \\ 5 & -1 & 2 \\ 1 & 3 & 0 \end{bmatrix} \text{ is}$$

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

c) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ d) none

Q.45) The values of 'a' if the slopes of the lines given by $12x^2 + axy - y^2 = 0$ differ by 7 are

a) ± 1 b) 0 c) ± 2 d) ± 4

Q.46) The equation of a parabola with vertex at the origin , x- axis as the axis and passing through (25, -10) is

a) $y^2 = 8x$ b) $x^2 = 8y$

c) $x^2 = 4y$ d) $y^2 = 4x$

Q.47) The polynomial of degree 2 when f(0) = 5 , f(1) = 9 , f(2) = 19 is

a) $3x^2 + x - 5$ b) $3x^2 + x + 5$

c) $3x^2 - x - -6$ d) $3x^2 + 2x - 5$

Q.48) The compound statement p ↔ q means

a) P only if q

b) q is necessary for p

c) if p then q and if q then p

d) q if p

Q.49) The solution of $cos^2(x - y)\frac{dy}{dx} = 1$ is

a) tan (x –y) + c = y

b) y = sin (x-y)+c

c) sec (x-y) + c = y

d) y=cot (x-y) + c

Q.50) If $y = \log_{10} x + \log_x x$ then $\frac{dy}{dx}$ =

a) $1 + \frac{1}{x log_{10}}$ b) $\frac{1}{x log_{10}} + x$

c) $\frac{1}{x log_{10}}$ d) none

Q.51) $\int \frac{dx}{4-5sinx}$ =

a) $\frac{2}{3}\tan^{-1}\left[\frac{5\tan {}^{x}/_{2}-4}{3}\right] + c$ b) log | 5 – 4 sinx | + c

c) $\frac{1}{3}\log\left|\frac{2tan {}^{x}/_{2}-4}{2tan {}^{x}/_{2}-1}\right| + c$ d) $\frac{2}{3}\log\left|5\tan {}^{x}/_{2}+4\right| + c$

Q.52) If $y = \sec^{-1}\left(\frac{1+x}{\sqrt[2]{x}}\right)$ then $\frac{dy}{dx}$ =

a) $\frac{1}{\sqrt{x}(1+x)}$ b) $\frac{-1}{\sqrt{x}(1+x)}$

c) $\frac{1}{\sqrt{x}(1+x)}$ d) $\frac{-1}{\sqrt{x}(1+x)}$

Q.53) $\lim_{x\to\infty} x^4 . sin\left(\frac{1}{x^5}\right)$ =

a) 1 b) ∞ c) 0 d) does not exit

Q.54) The focus of the parabola y^2 = 8x is one of the vertices of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

If the length of the conjugate axis of this hyperbola is 2, the equation of the hyperbola is

a) $\frac{x^2}{4} - y^2 = 1$ b) $\frac{x^2}{4} + y^2 = 1$

c) $x^2 - \frac{y^2}{4} = 1$ d) $x^2 - y^2 = 4$

Q.55) $\int tanx.e^{3\log\cos x}.dx =$

a) $\frac{-cos^3x}{3} + c$ b) $\frac{sin^3x}{3} + c$

c) $\frac{tan^3x}{3} + c$ d) $\frac{sec^3x}{3} + c$

Q.56) $\lim_{x\to a} \frac{-a}{|x-a|}$

a) 0 b) 1 c) -1 d) does not exit

Q.57) If $x = a\left[\cos t + \log\left(tan\,{}^1/_2\right)\right]$ $y = a \sin t$ then $\frac{dy}{dx} =$

a) cosec t b) $\log sec^2\left({}^t/_2\right)$

c) tan t d) cot t

Q.58) The equation of the curve that passes through the point (3,-4) such that the slope of its tangent at (x, y) is $\frac{2y}{x}$ is given by

a) $y = 4x^2$ b) $y = 3x^2$ c) $y = x^2$ d) $4x^2 + 9y = 0$

Q.59) $\int_0^4 2^x dx$ by dividing [0,4] into 4 equal subintervals by using Trapezoidal rule is

a) 22.2 b) 22.5 c) 22.8 d) 22.6

Q.60) The two values of k for which the lines with direction ratios k, -6 ,-2 and k – 1 , k , 4 are perpendicular to each other are

a) 8, -1 b) 2,3 c) 8,1 d) -8 ,-1

Q.61) 'p' and 'q' are any two statement then the rules fir negations of compound statements are

a) $\sim(p \vee q) \equiv \sim p \wedge \sim q$

b) $\sim(p \wedge q) \equiv \sim p \vee \sim q$

c) $\sim(p \rightarrow q) \equiv p \wedge \sim q$

d) All of these

Q.62) If the lines given by $x^2 - 4xy + y^2 = 0$ and x + y = 5 contain the sides of an equilateral triangle , its area is

a) $\frac{50}{\sqrt{3}}$ sq.units b) $\frac{25}{\sqrt{3}}$ sq.units

c) 5 sq.units d) $\frac{25}{2\sqrt{3}}$ sq.units

Q.63) $\int \frac{(4x+1)dx}{\sqrt{2x^2+x-3}} =$

a) $\sqrt{2x^2+x-3}+c$ b) $2\sqrt{2x^2+x-3}+c$

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

Q.64) The minimum value of z = 3x + 2y subject to $x + 2y \leq 6$, $x + y \geq 2$, $x \geq 0$, $y \geq 0$ occurs at

a) (2,0) b) (6,0) c)(0,3) d) (0,2)

Q.65) From a well shuffled pack of 52 cards , a card is drawn at random . The probability that it is a heart or a queen is

a) $\frac{7}{13}$ b) $\frac{4}{13}$ c) $\frac{5}{13}$ d) $\frac{3}{13}$

Q.66) If $A(\theta) = \begin{bmatrix} sec\theta & tan\theta & 0 \\ tan\theta & sec\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$ then $[A(\theta)]^{-1} =$

a) $A(-\theta)$ b) $A(2\theta)$ c) $A(\theta)$ d) none

Q.67) If the length of the latus rectum is $^5/_2$ and eccentricity is $^1/_2$ then the equation of the ellipse in the standard form is

a) $9x^2 + 12y^2 = 25$ b) $x^2 + 12y^2 = 25$

c) $9x^2 + y^2 = 25$ d) $x^2 + y^2 = 25$

Q.68) $y = acos(bx + c)$ is a solution of

a) $\frac{d^2y}{dx^2} + b\frac{dy}{dx} + y = 0$ b) $\frac{dy}{dx} + by = 0$

c) $\frac{d^2y}{dx^2} + b^2y = 0$ d) $\frac{dy}{dx} + ay = 0$

Q.69) The acute angle between the tangents to the parabola $y^2 = 8x$ from the point (6,7) is

a) 30^0 b) $\tan^{-1}\left(\frac{1}{3}\right)$ c) $\tan^{-1}\left(\frac{1}{4}\right)$ d) $\tan^{-1}\left(\frac{1}{8}\right)$

Q.70) Which of the following statements are dual

(i) $x + x = x$ (ii) $(x^1)^1 = x$ (iii) $x + 1 = 1$ (iv) $x.x = x$

a) (i) and (ii) b) (ii) and (iii) c) (i) and (iv) d) (i) and (iii)

Q.71) If x and y are elements in Boolean algebra then (x+y) + (x'.y') =

a) x b) y c) 0 d) 1

Q.72) $\int \frac{1}{x^2+2xcos\alpha+1}\,dx =$

a) $\frac{1}{sin\alpha}\tan^{-1}\left(\frac{x+cos\alpha}{sin\alpha}\right) + c$ b) $\frac{1}{sin\alpha}\cot^{-1}\left(\frac{x+cos\alpha}{sin\alpha}\right) + c$

c) $\frac{1}{cos\alpha}\tan^{-1}\left(\frac{x+cos\alpha}{sin\alpha}\right) + c$ d) $\frac{1}{cos\alpha}cot^{-1}\left(\frac{x+cos\alpha}{sin\alpha}\right) + c$

Q.73) $\int e^x\left(\frac{2+sin^2x}{1+cos2x}\right)dx =$

a) $e^x cotx + c$ b) $e^x tanx + c$ C) $e^x sinx + c$ d) $e^x cosx + c$

Q.74) If $f(x) = sinx \quad 0 < x \leq {}^{\pi}/_{4}$

$= tanx \quad {}^{\pi}/_{4} < x \leq {}^{3\pi}/_{4}$

$= cosx \quad {}^{3\pi}/_{4} < x \leq \pi$ then

a) f is continuous on its domain

b) f is continuous on its domain except at $x = {}^{3\pi}/_{4}$

c) f is continuous on its domain except at $x = {}^{\pi}/_{4}$

d) f is continuous on its domain except at $x = {}^{\pi}/_{4}$, ${}^{\pi}/_{2}$, ${}^{3\pi}/_{4}$

Q.75) If y = $\sqrt{\frac{1-\sin 2x}{1+\sin 2x}}$ then $\frac{dy}{dx}$

a) $\frac{2}{1-\sin 2x}$ b) $\frac{-2}{1+\sin 2x}$

c) $\frac{2}{1+\sin 2x}$ d) $\frac{-2}{1-\sin 2x}$

Q.76) The approximate value of cos 61^0 given sin 60^0 = 0.8660 and 1^0= 0.0175

a) 0.4846 b) 0.4848 c) 0.4825 d) none

Q.77) $\int_0^a \frac{dx}{x+\sqrt{a^2-x^2}}$ =

a) ${}^{\pi}/_{2}$ b) ${}^{\pi}/_{4}$ c) π d) a

Q.78) The solution of the Differential equation $\sin^{-1}\left(\frac{dy}{dx}\right)$ = x +y is

a) tan (x+y) – sec (x + y) = x + c

b) sec (x+y) – tan (x + y) = x + c

c) sec (x + y) = x + c

d) tan (x + y) = x + c

Q.79) The director circle of $x^2 + y^2$ - 4x -6y -12 =0 is

a) $x^2 + y^2 = 25$

b) $x^2 + y^2$ - 6x -4y -37 =0

c) $x^2 + y^2$ - 4x -6y -37 =0

d) none

Q.80) A (adj A) =

a) |A| b) |A| . I c) $A^{-1}.I$ d) none

Q.81) For a square matrix A of order 3 x 3 $a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13}$ =

a) |A| b) |A| . I c) $A^{-1}.I$ d) none

Q.82) 'Good food is not Cheap ' and 'Cheap food is not good ' the statement are

a) equivalent b) not equivalent

c) negation of each other d) none

Q.83) The negation of 'Raju and chhotu are brothers ' is

a) Raju and Chhotu are not brothers

b) Raju or Chhotu are not brothers

c) Raju and Chhotu are sisters

d) none of these

Q.84) The triangle formed by $x^2 + 4xy + y^2 = 0$ and the line x – y = 4 is

a) isosceles triangle b) equilateral triangle

c) right angled triangle d) none of these

Q.85) If P(t_1) and Q(t_2) are the end points of a focal chord of a parabola $y^2 =$ 4ax then $t_1.t_2$ =

a) 1 b) 0 c) -1 d) 2

Q.86) In a ΔABC, D is the midpoint of BC, M is the midpoint of AD then $\overline{AM} =$

a) $1/2(\overline{AB} + \overline{AC})$ b) $1/3(\overline{AB} + \overline{AC})$ c) $1/4\ (\overline{AB} + \overline{AC})$ d) None.

Q.87) If $5\overline{AB} - 3\overline{AC} - 2\overline{AD} = O$ then the points of B, C, D are

a) Collinear b) Non-collinear c) Non -coplanar d) None

Q.88) The angle between two lines whose direction cosine given by the equations l +m + n =0 & $l^2 + m^2 - n^2 = 0$ is

a) 30^0 b) 45^0 c) 90^0 d) 60^0

Q.89) The point of intersection of the lines $= \frac{x-4}{1} = \frac{y+3}{-1} = \frac{z+k}{-10}$ & $\frac{x-1}{4} = \frac{y+1}{-3} = \frac{z+10}{-1}$ *is*

a) 5,-4,-11 b) -5,4,-11 c) 5,4,-11 d) None

Q.90) If $|\bar{u}| = 3$ *and* $\bar{u}$ is equally inclined to unit vectors $\bar{\imath}, \bar{\jmath}, \bar{k}$ then $\bar{u} =$

a) $\frac{\pm 1}{\sqrt{3}}(\bar{\imath} + \bar{\jmath} + \bar{k})$ b) $\pm(\bar{\imath} + \bar{\jmath} + \bar{k})$ c) $\pm\sqrt{3}(\bar{\imath} + \bar{\jmath} + \bar{k})$ d) $3(\bar{\imath} + \bar{\jmath} + \bar{k})$

Q.91) The equation of a plane is $\bar{r} \cdot (5\bar{\imath} + 4\bar{\jmath} - 3\bar{k}) + 5 = 0$ then the length of the normal from the origin is

a) $\frac{1}{\sqrt{2}}$ b) $\sqrt{2}$ c) 1 d) 2

Q.92) The sum of Rs 1000 is invested at a rate of 4% per year compounded continuously. The time when the amount will be Rs 2000/- is

a) 50 log2 b) 25 log2 c) 75 log2 d) 100 log2

Q.93) the equation of tangents to the circle $x^2 + y^2 = 4$ which are inclined to the x-axis at an angle 60^0 are

a) $y = \sqrt{3}\,x \pm 1$ b) $y = \sqrt{3}\,x \pm 2$

c) $y = \sqrt{3}\,x \pm 4$ d) $y = \sqrt{2}\,x \pm 3$

Q.94) If $x.y = x + y$ *then* $\frac{dy}{dx} =$

$a)\left(\frac{1+y}{1-x}\right)^2$ $b)\ \frac{1}{(1-x)^3}$ $c)\ \frac{-1}{1-xy}$ $d)\frac{-1}{(x-1)^2}$

Q.95) The circle on the focal radii of a parabola as diameter touches :-

a) the tangents at the vertex b) the directrix

c) the x-axis d) none

Q.96) which of the following is not a logical statements

a) Every square is a rhombus b) Switch on the bulb

c) Sum of the angles of a triangle is always 180^0 d) $2 \leq 2$

Q.97) The extreme values of the function f(x , y) = x - y over the convex polygon defined by

x + y ≥ 1 – x + 2y ≤ 1 , x ≤ 1 , x ≥ 0 , y ≥ 0 is given by

a) max = 0 , min = $^1/_2$ b) max = 1 , min = $^1/_2$

c) max = 1 , min = $^{-1}/_3$ d) max = 1 , min = -1

Q.98) The minimum value of z = x + 4y subject to x + 3y ≥ 3 , 2x + y ≥ 2 , x ≥ 0 , y ≥ 0 is

a) $3\frac{4}{5}$ b) 3 c) 2 d) 8

Q.99) The equation of a line passing through (4 , -5) and perpendicular to the line 3x + 4y + 5 = 0 is given by

a) 4x + 3y + 31 = 0 b) 4x + 3y - 31 = 0

c) 4x + 4y + 5 = 0 d) 4x - 3y - 31 = 0

Q.100) $\int x^6 \sin(5x^7)\, dx = \frac{k}{5}\cos(5x^7)$ $x \neq 0$ *then*

a) $k = -\frac{1}{7}$ $b)\ k = -\frac{1}{6}$ $c)\ k = -\frac{7}{3}$ $d)\ k = 7$

ANSWERS:-

1) b	11) b	21) b	31) c	41) a	51) c	61) d	71) d	81) a	91) a
2) b	12) a	22) a	32) a	42) d	52) d	62) d	72) a	82) a	92) b
3) d	13) c	23) a	33) d	43) a	53) c	63) c	73) b	83) b	93) c
4) b	14) b	24) b	34) a	44) b	54) a	64) d	74) d	84) b	94) d
5) a	15) a	25) a	35) c	45) a	55) a	65) b	75) b	85) c	95) a
6) d	16) c	26) a	36) b	46) d	56) d	66) a	76) b	86) c	96) b
7) b	17) a	27) b	37) a	47) b	57) c	67) a	77) b	87) a	97) d
8) d	18) c	28) d	38) b	48) c	58) d	68) c	78) a	88) d	98) b
9) d	19) b	29) a	39) a	49) d	59) b	69) d	79) c	89) a	99) d
10) d	20) d	30) b	40) b	50) c	60) a	70) c	80) b	90) c	100) a