PRACTICE PAPER TERM-I

CLASS-XII **SUB. : MATHEMATICS**

TIME : 90 MIN. **MM: 40**

General Instructions:

1. This question paper contains three sections – A, B and C. Each part is compulsory.
2. Section - A has 20 MCQs, attempt any 16 out of 20.
3. Section - B has 20 MCQs, attempt any 16 out of 20
4. Section - C has 10 MCQs, attempt any 8 out of 10.
5. There is no negative marking.
6. All questions carry equal marks.

SECTION - A

(In this section, attempt any 16 questions out of Questions 1 – 20. Each Question is of 1 mark weightage.)

Q1. Cot $(\tan^{-1}a + \cot^{-1}a)$ is equal to:

(a) not defined (b) 2a (c) 0 (d) $\frac{\pi}{2}$

Q2. Relation R in the set N of natural numbers defined as R = {(x, y) : y = x + 5 and x < 4} is:

(a) reflexive (b) symmetric (c) transitive (d) None of these

Q3. Two matrices A and B are multiplied to get AB if

(a) both are rectangular (b) both have same order

(c) no. of columns of A is equal to no. of rows of B (d) no. of rows of A is equal to no. of columns of B

Q4. If matrix $\begin{bmatrix} 0 & 3 & x+y \\ x-y & -2 & 5 \\ 9 & 5 & 3 \end{bmatrix}$ is symmetric matrix, then the values of x and y will be:

(a) x =6, y = 3 (b) x = - 6, y = 3 (c) x = 3, y = 6 (d) x = 3, y = - 6

Q5. Let **R** be the relation in the set **N** given by R = {(a, b) : a = b – 2; b > 6}. Choose the correct answer.

(A) (2, 4) ∈ R (B) (3, 8) ∈ R (C) (6, 8) ∈ R (D) (8, 7) ∈ R

Q6. If $A=\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$, $B=\begin{bmatrix} 3 & 3 & 5 \\ 1 & 0 & 1 \end{bmatrix}$ then order of matrix AB is:

(a) 2×3 (b) 3×2 (c) 2×2 (d) 3×3

Q7. The value of $\begin{vmatrix} sin10° & -cos10° \\ sin80° & cos80° \end{vmatrix}$ is :

(a) 1 (b) 0 (c) 2 (d) None

Q8. Discontinue point of the function f(x)=5x−3 is

(a) $x = 3/5$ (b) $x = 5/3$ (c) all points (d) None

Q9. For what value of k is the function $(x) = \begin{cases} \frac{tan2x}{x}, & x \neq 0 \\ k \quad , & x = 0 \end{cases}$; at $x = 0$ will be continue.

(a) $k = 0$ (b) $k = ½$ (c) $k = 2$ (d) None

Q10. Let A be a square matrix of order 3 × 3 and if |A| = 5 then |A Adj.A| is equal to:

(a) 25
(b) 5
(c) 125
(d) 243

Q11. The matrix $\begin{bmatrix} k & 2 \\ 3 & 4 \end{bmatrix}$ is not invertible if k is equal to

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

Q12. Local maximum value of $h(x) = x + 1, x \in (-1, 1)$ is

(a) 2
(b) 0
(c) -1
(d) Not Defined

Q13. If A = $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then A^2 is equal to:

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

Q14. If $A = (a_{ij}) = \begin{bmatrix} 1 & 2 & 5 \\ 1 & -5 & 5 \\ 1 & 4 & -2 \end{bmatrix}$ and $B = (b_{ij}) = \begin{bmatrix} 7 & 10 & -1 \\ -3 & 2 & 4 \\ 9 & 5 & 2 \end{bmatrix}$, then value of $3a_{22} - 5b_{32}$ is:

(a) - 40 (b) -10 (c) 10 (d) None

Q15. If $y = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$ then dy/dx is:

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

Q16. If $x = a\sec\theta$, $y = b\tan\theta$, then $\frac{d^2y}{dx^2}$ at $\theta = \frac{\pi}{6}$ is:

(a) $\frac{-3\sqrt{3}\,b}{a^2}$
(b) $\frac{-2\sqrt{3}\,b}{a}$
(c) $\frac{-3\sqrt{3}\,b}{a}$
(d) $\frac{-b}{3\sqrt{3}a^2}$

Q17. Critical points of the function $f(x) = -2x^3 - 9x^2 - 12x + 1$ are

(a) 1, 2 (b) -1, 2 (c) -1 , - 2 (d) 1, - 2

Q 18. The line $y = x + 1$ is a tangent to the curve $y^2 = 4x$ at the point

(a) (1, 2) (b) (2, 1) (c) (1, - 2) (d) (- 1, 2)

Q19. The slope of the normal to the curve $y = 2x^2 + 3\sin x$ at $x = 0$ is:

(a) 3
(b) 1/3
(c) -3
(d) -1/3

Q20. In linear Programming Problem **Z = ax + by** is known as:

(e) constraints
(f) Optimal Value
(g) Objective Function
(h) Decision variable

SECTION - B

(In this section, attempt any 16 questions out of Questions 21 – 40. Each Question is of 1 mark weightage.

Q21. Let f : **R** → **R** be defined as $f(x) = x^4$. Choose the correct answer.

(a) f is one-one and onto (b) f is many-one and onto (c) f is one-one but not onto (d) f is neither one-one nor onto.

Q22. Find x : $2\sin^{-1}x = \frac{\pi}{3}$

(a) $-\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{2}$ (d) None of them

Q23. If $\begin{bmatrix} a+4 & 3b \\ 8 & -6 \end{bmatrix} = \begin{bmatrix} 2a+2 & b+2 \\ 8 & a-8b \end{bmatrix}$, then the value of 2a + b:

(a) 5 (b) - 3 (c) 11 (d)None

Q24. If relation R in the set A = {x ∈ Z : 0 ≤ x ≤ 8}, given by R = {(a, b) : |a – b| is a multiple of 4} is an equivalence relation. Then equivalence class of [2] will be:

(a) 2, 6 (b) 0, 4 (c) 4, 8 (d) None of them

Q25. If the given points (5,5), (k,1) and (10,7) lie on a straight line then k will be equal to:

(a) K= 5
(b) K = - 5
(c) K = 1/5
(d) K= -1/5

Q26. The function $f: R \to R$ defined by $f(x) = x - 4$ is:

(a) Bijective (b) Surjective but not injective (c) Injective but not surjective (d) Neither injective nor surjective

Q27. $\text{Tan}^{-1}\sqrt{3} - \cot^{-1}(-\sqrt{3})$ is equal to :

(a) $\frac{\pi}{2}$ (b) $-\frac{\pi}{2}$ (c) π (d) 1

Q28. If A = $\begin{bmatrix} 0 & -3 & p \\ 3 & 0 & -4 \\ 1 & q & r \end{bmatrix}$ is a skew sym. matrix then p + q - r will be equal to:

(a) -4 (b) 3 (c) 3 (d) None

Q29. Simplest form of $\text{Tan}^{-1}\left(\frac{2\sqrt{x}}{1-x}\right)$ is:

(a) $\tan^{-1}x$
(b) $2\tan^{-1}x$
(c) $2\tan^{-1}\sqrt{x}$
(d) None

Q30. If A = $[1 \quad 2 \quad -3]$ and B = $\begin{bmatrix}1\\2\\3\end{bmatrix}$ then $(AB)^2$ is equal to:

(a) 14 (b) 169 (c) 16 (d) None of these

Q31. If A and B are square matrices of the same order and AB = 3I then A^{-1} is equal to :

(a) 3B (b) $\frac{1}{3}B$ (c) $3B^{-1}$ (d) $\frac{1}{3}B^{-1}$

Q32. The region represented by the inequation system $x, y \geq 0, \ x + y \leq 3$ is

a) unbounded in first quadrant
b) unbounded in first and second quadrant
c) bounded in first quadrant
d) none of these

Q33. Differentiation of $y = 7^x$ is

(a) 0 (b) 7^x (c) $\frac{7^x}{logx}$ (d) $7^x\log 7$

34. If $y = \log\sqrt{tanx}$ then value of $\frac{dy}{dx}$ at $x = \frac{\pi}{4}$ is

(a) ∞ (b) 0 (c) 1 (d) $\frac{1}{2}$

Q35. $f(x) = e^{2x}$ is

(a) Strictly Increasing on **R** (b) Strictly Decreasing on **R**

(c) Decreasing on **R** (d) Neither Increasing nor Decreasing

Q36. Absolute maximum value of $f(x) = x^3, \quad x \in [-2, 2]$ is

(a) - 8 (b) 0 (c) 8 (d) 12

Q37. Local Maximum value of the function $f(x) = \text{Sin}(3x) + 7$ is

(a) 7 (b) Infinity (c) 8 (d) 10

Q38. The points on the curve $\frac{x^2}{9}+\frac{y^2}{16}=1$ at which the tangents are parallel to y axis are:

(a) $(0, \pm 4)$

(b) $(\pm 4, 0)$

(c) $(\pm 3, 0)$

(d) $(0, \pm 3)$

Q39. The interval in which $y = x^2\ e^{-x}$ is increasing is

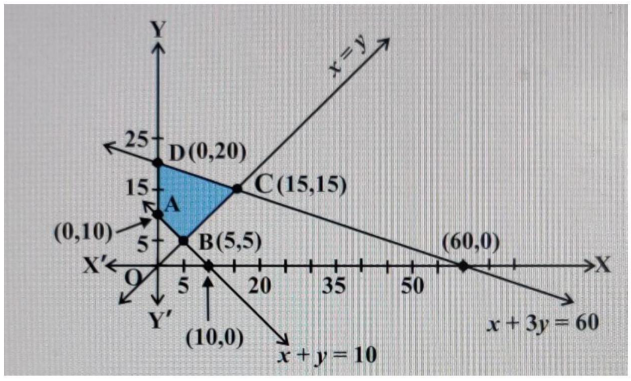
(a) $(-\infty, \infty)$

(b) $(-2, 0)$

(c) $(2, \infty)$

(d) $(0, 2)$

Q40. From the given figure Maximum value of Z = 3x + 9y will be:



(a) 90

(b) 280

(c) 180

(d) 60

SECTION - C

(In this section, attempt any 8 questions out of Questions 41 – 50. Each Question is of 1 mark weightage.)
(Questions 46-50 are based on a Case Study)

Q41. The variable x and y in a linear programming problem are called:

(a) Decision variables

(b) Linear variables
(c) Optimal variables
(d) None of these

Q42. If f(x) = [x] is a greatest integer function then it will be continuous if

(a) $x \in R$ (b) $x \in [1,5]$ (c) $x \in (1,2)$ (d) None

Q43. dy/dx of a function expressed in parametric form x = sint, y = cos2t is

(a) 4 sint (b) - 4 cost (c) $\frac{-4}{cosec\ t}$ (d) 4 sect

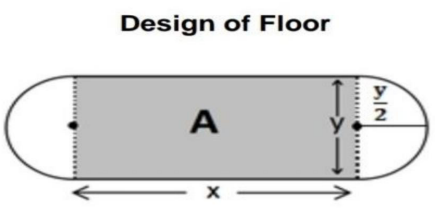
Q44. If corner points of a feasible solution are (0,8), (4, 10), (6,8), (6,5), (5,0),(0,0) and Objective function is **Z = 3x -4y** then Minimum of Z occurs at :

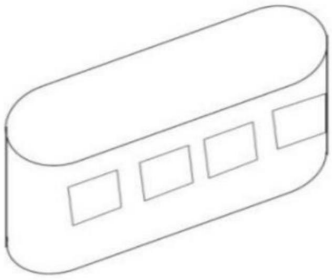
(a) (0,0)
(b) (0,8)
(c) (5,0)
(d) (4,10)

Q45. Inverse of matrix $\begin{bmatrix} 2 & -3 \\ 3 & -4 \end{bmatrix}$ is:

(a) $\begin{bmatrix} -4 & 3 \\ -3 & 2 \end{bmatrix}$ $(b)\begin{bmatrix} 4 & -3 \\ 3 & -2 \end{bmatrix}$ $(c)\begin{bmatrix} -2 & 3 \\ -3 & 4 \end{bmatrix}$ $(d)\begin{bmatrix} 2 & -3 \\ 3 & -4 \end{bmatrix}$

An architect designs a building for a multi-national company. The floor consists of a rectangular region with semicircular ends having a perimeter of 200m as shown below:





Building

Based on the above information answer the following:

Q46. If x and y represents the length and breadth of the rectangular region, then the relation between the variables is

(a) $x + \pi y = 100$

(b) $2x + \pi y = 200$

(c) $\pi x + y = 50$

(d) $x + y = 100$

Q47. The area of the rectangular region A expressed as a function of x is

(a) $\frac{2}{\pi}(100\,x - x^2)$

(b) $\frac{1}{\pi}(100\,x - x^2)$

(c) $\frac{x}{\pi}(100 - x)$

(d) $\pi y^2 + \frac{2}{\pi}(100\,x - x^2)$

Q48. The maximum value of area A is

(a) $\frac{\pi}{3200}\,m^2$

(b) $\frac{3200}{\pi}\,m^2$

(c) $\frac{5000}{\pi}\,m^2$

(d) $\frac{1000}{\pi}\,m^2$

Q49. The CEO of the multi-national company is interested in maximizing the area of the whole floor including the semi-circular ends. For this to happen the valve of x should be :

a) 0 m

b) 30 m

c) 50 m

d) 80

Q50. The extra area generated if the area of the whole floor is maximized is :

a) $\frac{3000}{\pi}\,m^2$

b) $\frac{5000}{\pi}\,m^2$

c) $\frac{7000}{\pi}\,m^2$

d) No change Both areas are equal

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