GATEWAY
EDUCATION
Delhi-NCR, Sonipat

- Mock Test
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- How to Select Perfect Course/College after 12th?

MOCK TEST-1
Class XII

MATHEMATICS
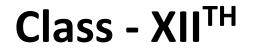
Class - XIITH

MATHEMATICS

MOCK EXAMS

Serial Number: 1

Time: 3 Hours
Maximum Marks: 80

Exam Date: _____

General Instructions:

1. This Question Paper has 5 Sections A-E.

2. Section **A** has 20 MCQs carrying 1 mark each

3. Section **B** has 5 questions carrying 02 marks each.

4. Section **C** has 6 questions carrying 03 marks each.

5. Section **D** has 4 questions carrying 05 marks each.

6. Section **E** has 3 case based integrated units of assessment (04 marks each) with sub parts of the values of 1, 1 and 2 marks each respectively.

7. All Questions are compulsory

8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION A

1. The corner points of the feasible region determined by the system of linear constraints are (0, 10), (5, 5), (15, 15), (0, 20).Let Z = px + qy, where p, q > 0. Condition on p and q so that the maximum of Z occurs at both the points (15, 15) and (0, 20) is

(a) p = q   (b) p = 2q   (c) q = 2p   (d) q = 3p

2. The function f $(x) = \frac{4-x^2}{4x-x^3}$ is

(a) discontinuous at only one point   (b) discontinuous at exactly two points
(c) discontinuous at exactly three points   (d) none of these

3. The solution of the differential equation $2x\frac{dy}{dx} - y = 3$ represents a family of

(a) straight lines   (b) circles   (c) parabolas   (d) ellipses

4. The area of the region bounded by the curve $y = x^2$ and the line $y = 16$

(a) $\frac{32}{3}$ (b) $\frac{256}{3}$ (c) $\frac{64}{3}$ (d) $\frac{128}{3}$

5. If A, B and C are angles of a triangle, then the determinant

$$\begin{vmatrix} -1 & \cos C & \cos B \\ \cos C & -1 & \cos A \\ \cos B & \cos A & -1 \end{vmatrix} \text{ is equal to}$$

(a) 0   (b) – 1   (c) 1   (d) None of these

6. The function f $(x) = 2x^3 - 3x^2 - 12x + 4$, has

(a) two points of local maximum   (b) two points of local minimum
(c) one maxima and one minima   (d) no maxima or minima

7. The equations of x-axis in space are

(a) $x = 0, y = 0$ (b) $x = 0, z = 0$ (c) $x = 0$ (d) $y = 0, z = 0$

8. The domain of $\sin^{-1} 2x$ is

(a) [0, 1]   (b) [– 1, 1]   (c) $\left[-\frac{1}{2}, \frac{1}{2}\right]$ (d) [–2, 2]

9. $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \frac{dx}{1+\cos 2x}$ is equal to

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

= 0.4, P(B) = 0.8 and P(B | A) = 0.6, then P(A ∪B) is equal to

(a) 0.24   (b) 0.3   (c) 0.48   (d) 0.96

11. If A and B are symmetric matrices of the same order, then $(AB' - BA')$ is a

(a) Skew symmetric matrix   (b) Null matrix

(c) Symmetric matrix   (d) None of these

12. The number of points at which the function $f(x) = \frac{1}{x-[x]}$ is not continuous is

(a) 1   (b) 2   (c) 3   (d) none of these

13. Let N be the set of natural numbers and the function $f : N \to N$ be defined by $f(n) = 2n + 3 \ \forall \ n \in N$. Then f is

(a) surjective   (b) injective   (c) bijective   (d) none of these

14. The order of the differential equation of all circles of given radius a is

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

15. For real numbers x and y, define xRy if and only if $x - y + \sqrt{2}$ is an irrational number. Then the relation R is

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

16. If A and B are independent events such that $0 < P(A) < 1$ and $0 < P(B) < 1$, then which of the following is not correct?

(a) A and B are mutually exclusive   (b) A and B′ are independent

(c) A′ and B are independent   (d) A′ and B′ are independent

17. The value of λ for which the two vectors $2\hat{\imath} - \hat{\jmath} + 2\hat{k}$ and $3\hat{\imath} + \lambda\hat{\jmath} + \hat{k}$ are perpendicular is

(a) 2   (b) 4   (c) 6   (d) 8

18. Consider the non-empty set consisting of children in a family and a relation R defined as aRb if a is brother of b. Then R is

(a) symmetric but not transitive   (b) transitive but not symmetric

(c) neither symmetric nor transitive   (d) both symmetric and transitive

DIRECTION: In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option

(a)Assertion and Reason both are correct statements and Reason is the correct
ı of Assertion.

on and Reason both are correct statements but Reason is not the
ılanation of Assertion.

(c) Assertion is correct statement but Reason is wrong statement.
(d) Assertion is wrong statement but Reason is correct statement.

19.Assertion : If f . g is continuous at $x = $ a, then f and g are separately continuous at $x = $ a.
Reason : The composition of two continuous function is a continuous function.

20.Assertion : If we multiply each element of a row (or a column) of a determinant by constant k, then value of the determinant is multiplied by k.

Reason : Multiplying a determinant by k means multiplying the elements of only one row (or one column) by k.

SECTION B

21. Find the intervals in which function $f(x) = 2x^3 + 9x^2 + 12x + 20.$ is increasing and decreasing.

22. If $\tan^{-1} x - \cot^{-1} x = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$, find the value of x.

23. Show that the points (a + 5, a – 4), (a – 2, a + 3) and (a, a) do not lie on a straight line for any value of a.

24. Evaluate $\int_{-a}^{a} \sqrt{\frac{a-x}{a+x}} \, dx.$

25. Find a vector of magnitude 11 in the direction opposite to that of $\overrightarrow{PQ}$, where P and Q are the points (1, 3, 2) and (–1, 0, 8), respetively.

SECTION C

26. Differentiate $\tan^{-1}\left(\frac{1+2x}{1-2x}\right)$ with respect to $\sqrt{1 + 4x^2}$.

27. If A= $\begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$, then find $A^2 - 5A - 14I$. Hence, obtain A^3.

28. Solve the following LPP graphically:
Maximise Z = 2x + 3y,
subject to $x + $ y $\le$ 4, $x \ge 0$, $y \ge 0$.

he area enclosed by the curve $x = $ 3cost, $y = $ 2sint.

30. Find the area of greatest rectangle that can be inscribed in an ellipse,

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

31. Find the angle between the lines whose direction cosines are given by the equations: $3l + m + 5n = 0$ and $6mn - 2nl + 5lm = 0$.

SECTION D

32. Evaluate $\int \frac{1}{1+x^4}\, dx$.

33. Find the greatest and least values of $(\sin^{-1} x)^2 + (\cos^{-1} x)^2$.

34. A car manufacturing factory has two plants, X and Y. Plant X manufactures 70% of cars and plant Y manufactures 30%. 80% of the cars at plant X and 90% of the cars at plant Y are rated of standard quality. A car is chosen at random and is found to be of standard quality. What is the probability that it has come from plant X?

35. Find the equation of a curve passing through the point (1, 1) if the perpendicular distance of the origin from the normal at any point P(x, y) of the curve is equal to the distance of P from the x – axis.

SECTION E
Case study based questions are compulsory.

36. Give an example of a map
(i) which is one-one but not onto
(ii) which is not one-one but onto
(iii) which is neither one-one nor onto.

37. In the matrix $A = \begin{bmatrix} a & 1 & x \\ 2 & \sqrt{3} & x^2 - y \\ 0 & 5 & -\frac{2}{5} \end{bmatrix}$, write :
(i) The order of the matrix A
(ii) The number of elements
(iii) Write elements a_{23}, a_{31}, a_{12}

38. $P(x) = -5x^2 + 125x + 37500$ is the total profit function of a company, where x is the production of the company.
1. What will be the production when the profit is maximum?

                         (b) 12.5   (c) –12.5   (d) –37500
will be the maximum profit?
,28,125   (b) Rs 38281.25   (c) Rs 39,000   (d) None of these
3. Check in which interval the profit is strictly increasing

(a) $(12.5, \infty)$ (b) for all real numbers
(c) for all positive real numbers (d) $(0, 12.5)$

GATEWAY EDUCATION
Delhi-NCR, Sonipat

Learning Space

Library

Cafeteria

Atrium

GYM

Swimming Pool

Mess

Computer Lab