GATEWAY
EDUCATION
Delhi-NCR, Sonipat

- Mock Test
- Notes
- Assignments
- Career Counseling
- How to Select Perfect Course/College after 12th?

MOCK TEST-2

Class XII

MATHEMATICS

Programs at Gateway: B.Tech CSE | B.Tech CSE (AI & ML) | B.Pharm | B.Arch
BCA | MCA | BBA | MBA | K-12 School

OUR VENTURES

HRM GLOBAL SCHOOL | GATEWAY COLLEGE OF ARCHITECTURE & DESIGN | GATEWAY INSTITUTE OF ENGINEERING & TECHNOLOGY | GATEWAY COLLEGE OF PHARMACY | rishihood university

Class - XIITH
MATHEMATICS

MOCK EXAMS-2

Serial Number: 2

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 $\pi = 22/7$ wherever required if not stated.

SECTION A

1. Corner points of the feasible region for an LPP are (0, 2), (3, 0), (6, 0), (6, 8) and (0, 5).Let F = $4x + 6y$ be the objective function. The Minimum value of F occurs at
(a) (0, 2) only
(b) (3, 0) only
(c) the mid point of the line segment joining the points (0, 2) and (3, 0) only
(d) any point on the line segment joining the points (0, 2) and (3, 0).

2. Three persons, A, B and C, fire at a target in turn, starting with A. Their probability of hitting the target are 0.4, 0.3 and 0.2 respectively. The probability of two hits is
(a) 0.024 (b) 0.188 (c) 0.336 (d) 0.452

3.If $\vec{a}$ and $\vec{b}$ are unit vectors, then what is the angle between $\vec{a}$ and $\vec{b}$ for $\sqrt{3}\,\vec{a} - \vec{b}$ to be a unit vector?
(a) 30° (b) 45° (c) 60° (d) 90°

4. P is a point on the line segment joining the points (3, 2, –1) and (6, 2, –2). If x co-ordinate of P is 5, then its y co-ordinate is
(a) 2 (b) 1 (c) –1 (d) –2

5. The domain of the function $y = \sin^{-1}(-x^2)$ is
(a) [0, 1] (b) (0, 1) (c) [–1, 1] (d) φ

6. The interval on which the function f $(x) = 2x^3 + 9x^2 + 12x - 1$ is decreasing is: (a) [–1, ∞) (b) [–2, –1] (c) (– ∞, –2] (d) [–1, 1]

7. $\int \frac{dx}{\sin(x-a)\sin(x-b)}$ is equal to

(a) $\sin(b-a)\log_e\left|\frac{\sin(x-b)}{\sin(x-a)}\right| + C$ (b) $\operatorname{cosec}(b-a)\log_e\left|\frac{\sin(x-a)}{\sin(x-b)}\right| + C$

(c) $\operatorname{cosec}(b-a)\log_e\left|\frac{\sin(x-b)}{\sin(x-a)}\right| + C$ (d) $\sin(b-a)\log_e\left|\frac{\sin(x-a)}{\sin(x-b)}\right| + C$

8. 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

9. Total number of possible matrices of order 3 × 3 with each entry 2 or 0 is
(a) 9 (b) 27 (c) 81 (d) 512

10. The order and degree of the differential equation $\left[1+\left(\frac{dy}{dx}\right)^2\right]^2 = \frac{d^2y}{dx^2}$ respectively, are

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

11. Let f **:** R → R be defined by f (*x*) = 3*x* – 4. Then f $^{-1}$(*x*) is given by

(a) $\frac{x+4}{3}$ (b) $\frac{x}{3}-4$ (c) 3*x* + 4 (d) None of these

12. The value of $\sin^{-1}\left(\cos\left(\frac{43\pi}{5}\right)\right)$ is

(a) $\frac{3\pi}{5}$ (b) $\frac{-7\pi}{5}$ (c) $\frac{\pi}{10}$ (d) $\frac{-\pi}{10}$

13. If α, β, γ are the angles that a line makes with the positive direction of x, y, z axis, respectively, then the direction cosines of the line are.

(a) sin α, sin β, sin γ (b) cos α, cos β, cos γ

(c) tan α, tan β, tan γ (d) $\cos^2$ α, $\cos^2$ β, $\cos^2$γ

14. $\int_{a+c}^{b+c} f(x)dx$ is equal to

(a) $\int_a^b f(x-c)dx$ (b) $\int_a^b f(x+c)dx$ (c) $\int_a^b f(x)dx$ (d) $\int_{a-c}^{b-c} f(x)dx$

15. If A is a square matrix such that A^2 = I, then $(A - I)^3 + (A + I)^3 - 7A$ is equal to

(a) A (b) I – A (c) I + A (d) 3A

16. The smallest value of the polynomial $x^3 - 18x^2 + 96x$ in [0, 9] is

(a) 126 (b) 0 (c) 135 (d) 160

17. The value of $\tan^2(\sec^{-1}2) + \cot^2(\text{cosec}^{-1}3)$ is

(a) 5 (b) 11 (c) 13 (d) 15

18. The maximum number of equivalence relations on the set A = {1, 2, 3} are (a) 1 (b) 2 (c) 3 (d) 5

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 explanation of Assertion.

(b) Assertion and Reason both are correct statements but Reason is not the correct explanation of Assertion.

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

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

19.Assertion : The maximum value of the function f(*x*) = x^5 , *x* ∈ [-1, 1], is attained at its critical point, *x* = 0.

Reason : The maximum of a function can only occur at points where the derivative is zero.

20.Assertion : The relation P on set X is a transitive relation.

Reason (R): The relation P has a subset of the form {(a, b), (b, c), (a, c)}, where a, b, c ∈ X.

SECTION B

21. Find the solution of $(x + 2y^3)\frac{dy}{dx} - y = 0$.

22. If the points (–1, –1, 2), (2, m, 5) and (3,11, 6) are collinear, find the value of m.

23. A and B are two candidates seeking admission in a college. The probability that A is selected is 0.7 and the probability that exactly one of them is selected is 0.6. Find the probability that B is selected.

24. Which is greater, $\tan^{-1}(1)$ or $\tan(1)$?

25. If $f(x) = \begin{cases} \frac{x^3+x^2-16x+20}{(x-2)^2} & x \neq 2 \\ k, & x = 2 \end{cases}$ is continuous at $x = 2$, find the value of k.

SECTION C

26. Using matrix method, solve the system of equations $3x + 2y – 2z = 3$, $x + 2y + 3z = 6$, $2x – y + z = 2$.

27. Evaluate, $\int_{-\pi}^{\pi} \sin^3 x \cos^2 x \, dx$

28. If y(x) is a solution of $\left(\frac{2+\sin x}{1+y}\right)\frac{dy}{dx} = -\cos x$ and $y(0) = 1$, then find the value Of $y\left(\frac{\pi}{2}\right)$.

29. Using vectors, prove that the parallelogram on the same base and between the same parallels are equal in area.

30. Find the area of the region above the x-axis, included between the parabola $y^2 = ax$ and the circle $x^2 + y^2 = 2ax$.

31. Find the values of x which satisfy the equation $\sin^{-1}x + \sin^{-1}(1 – x) = \cos^{-1}x$.

SECTION D

32. Evaluate, $\int \frac{dx}{1+3\sin^2 x}$

33. Water is dripping out at a steady rate of 1 cu cm/sec through a tiny hole at the vertex of the conical vessel, whose axis is vertical. When the slant height of water in the vessel is 4 cm, find the rate of decrease of slant height, where the vertical angle of the conical vessel is $\frac{\pi}{6}$.

34. Express the matrix A as the sum of a symmetric and a skew symmetric matrix, where

$$A = \begin{bmatrix} 2 & 4 & -6 \\ 7 & 3 & 5 \\ 1 & -2 & 4 \end{bmatrix}$$

35. A manufacturing company makes two types of television sets; one is black and white and the other is colour. The company has resources to make at most 300 sets a week. It takes Rs 1800 to make a black and white set and Rs 2700 to make a coloured set. The company can spend not more than Rs 648000 a week to make television sets. If it makes a profit of Rs 510 per black and white set and Rs 675 per coloured set, how many sets of each type should be produced so that the company has maximum profit? Formulate this problem as a LPP given that the objective is to maximise the profit.

SECTION E

Case study based questions are compulsory.

36. The equation of motion of a missile are $x = 3t$, $y = -4t$, $z = t$,where the time 't' is given in seconds, and the distance is measured in kilometres.
Based on the above answer the following:

1. What is the path of the missile?
a) Straight line b) Parabola c) Circle d) Ellipse

2. Which of the following points lie on the path of the missile?
a) (6, 8, 2) b) (6, –8, –2) c) (6, –8, 2) d) (–6, –8, 2)

3.If the position of rocket at a certain instant of time is (5, –8, 10), then what will be the height of the rocket from the ground? (The ground is considered as the xy – plane).
a) 12 km b) 11 km c) 20 km d) 10 km

37. The reliability of a COVID PCR test is specified as follows:
Of people having COVID, 90**%** of the test detects the disease but 10**%** goes undetected.Of people free of COVID, 99**%** of the test is judged COVID negative but 1**%** are diagnosed as showing COVID positive. From a large population of which only 0.1**%** have COVID, one person is selected at random, given the COVID PCR test, and the pathologist reports him/her as COVID positive.

1.What is the probability of the 'person to be tested as COVID positive' given that 'he is actually having COVID?
a) 0.001 b) 0.1 c) 0.8 d) 0.9

2. What is the probability of the 'person to be tested as COVID positive' given that 'he is actually not having COVID'?
a) 0.01 b) 0.99 c) 0.1 d) 0.001

3.What is the probability that the 'person is actually not having COVID?
a) 0.998 b) 0.999 c) 0.001 d) 0.111

38. Sherlin and Danju are playing Ludo at home during Covid-19. While rolling the dice, Sherlin's sister Raji observed and noted the possible outcomes of the throw every time belongs to set {1,2,3,4,5,6}. Let A be the set of players while B be the set of all possible outcomes. A = {S, D}, B = {1,2,3,4,5,6}

1. Let $R : B \to B$ be defined by R = $\{(x, y)$: y *is divisible* b $\}$ is
a) Reflexive and transitive but not symmetric
b) Reflexive and symmetric and not transitive
c) Not reflexive but symmetric and transitive
d) Equivalence

2. Let R be a relation on B defined by R = {(1,2), (2,2), (1,3), (3,4), (3,1), (4,3), (5,5)}.Then R is
a) Symmetric b) Reflexive c) Transitive d) None of these three

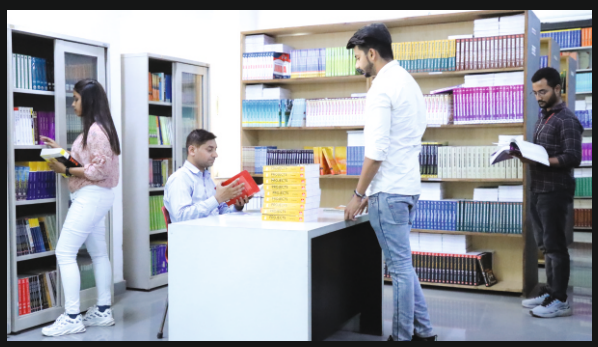
3.Let R: $B \to B$ be defined by R={(1,1),(1,2), (2,2), (3,3), (4,4), (5,5),(6,6)}, then R is
a) Symmetric b) Reflexive and Transitive
c) Transitive and symmetric d) Equivalence

GATEWAY EDUCATION

Delhi-NCR, Sonipat

Learning Space

Library



Cafeteria

Atrium

GYM

Swimming Pool

Mess

Computer Lab

GATEWAY EDUCATION

Delhi-NCR, Sonipat

ADMISSIONS OPEN

- B.Tech CSE
- B.Tech CSE (AI & ML)
- B.Pharm.
- B.Arch.
- BCA | MCA
- BBA | MBA
- PGDM
- K-12 School

Apply Now

UPCOMING PROGRAMS*

B.Sc. Nursing | GNM | B.Sc. MLT | D.Pharm. | B.Design

Bus Facility Available From:

Ganaur, Samalkha, Panipat, Kharkhoda
Narela, Baghpat, Baraut, Delhi

FREE BUS FACILITY FROM - SONIPAT CITY

Approved by COA, PCI & AICTE, New Delhi &
Affiliated to DCRUST Murthal, Pt. B.D. Sharma UHS Rohtak & AIMA

Campus Address:
Gateway Campus, Sector-11,
Delhi-NCR, Sonipat (Haryana)

Corporate Office:
D-11, Prashant Vihar, Rohini, New Delhi (110085)

Admission Helpline: 8800553350 | 7496999258