(SAMPLE PAPER)

CLASS-XII
MATHEMATICS(For DA students)

Time: 3 Hrs **Maximum Marks: 80**

1.Section A contains Q1 to Q26 of 2 marks each.
2.Section B contains Q27 to Q34 of 3 marks each.
3.Section C contains Q35 to Q42 of 4 marks each.
4.All questions of section-A are compulsory. Attempt any 4 questions out of 8 questions in secion-B. Attempt any 4 questions out of 8 questions in secion- C

SECTION – A

Choose a correct option from the given options from Q.No. 1 to Q. No. 7 :

1 Let R be the relation in the set N of natural numbers given by $R = \{(a,b): a = b-2, b > 6\}$. Choose the correct answer : 2

(a). $(2,4) \in R$ (b) $(3,8) \in R$ (c) $(6,8) \in R$ (d) $(8,7) \in R$

2 The function $f: R \to R$ given by $f(x) = 2x - 3$ is : 2

(a) one-one only (b) onto only (c) one-one and onto (d) into

3 Principal value of $\sin^{-1}\left(\frac{-1}{2}\right)$ is : 2

(a). $\frac{-\pi}{6}$ (b) $\frac{\pi}{6}$ (c) $\frac{-\pi}{3}$ (d) $\frac{\pi}{3}$

4 If $sin^{-1}x = y$, then is : 2

(a) $0 \le y \le \pi$ (b) $-\frac{\pi}{2} \le y \le \frac{\pi}{2}$ (c) $0 < y < \pi$ (d) $-\frac{\pi}{2} < y < \frac{\pi}{2}$

5 If $\begin{bmatrix} x & 1 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 3 & 1 \\ 2 & 1 \end{bmatrix}$ then value of x is : 2

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

6 If $\begin{vmatrix} x & 1 \\ 1 & x \end{vmatrix} = \begin{vmatrix} 2 & 0 \\ 7 & 4 \end{vmatrix}$ then value of x is : 2

(a). 0 (b) ± 1 (c) ± 2 (d) ± 3

7 If $AB = C$ and A is matrix of order 2×3 and B is matrix of order 3×4 then order of matrix C is : 2

(a). 2×4 (b) 4×2 (c) 2×2 (d) 3×3

Match the columns from Q.No. 8 to Q. No. 13 :

8 2

Col. A	Col. B
(a). $A + A'$	(i). Null matrix
(b) $A - A$	(ii) Skew symmetric matrix
	(iii) Symmetric matrix

9 2

Col. A	Col. B
(a). $f(x) = e^x$	(i). Continuous function
(b) $f(x) = \frac{1}{x}$	(ii) Identity function
	(iii) Discontinuous function

10 2

Col. A	Col. B
(a). $\frac{d}{dx}(\sin x)$	(i). $\tan x$
(b) $\frac{d}{dx}(\cos x)$	(ii) $\cos x$
	(iii) $-\sin x$

11 2

Col. A	Col. B
(a). $f(x) = x^2$	(i) Strictly Increasing function in $(0, \frac{\pi}{2})$
(b) $f(x) = sin\, x$	(ii) Strictly Increasing function in $(1, \infty)$
	(iii) Strictly Decreasing function in $(1, \infty)$

12 2

Col. A	Col. B
(a). Slope of tangent to the curve $y = x^2$ at (1,1).	(i) $-\frac{1}{3}$
(b) Slope of normal to the curve $y = x^3$ at (1,1).	(ii) 0
	(iii) 2

13 2

Col. A	Col. B
(a) $\int dx$	(i) $-\sin x + c$
(b) $\int \cos x\, dx$	(ii) $x + c$
	(iii) $\sin x + c$

Fill in the blanks from Q. No. 14 to Q. No. 20 from the following options:

$(-2,\ \sqrt{426},\ \frac{1}{2},\ \int_1^4 x^2dx\ ,4\int_0^3 \sqrt{9-x^2}dx,\ 2,e^{2x},\ 5,\ \tan x)$

14 $\int_0^1 x\,dx =$ _____ 2

15 Area of the region bounded between parabola $y = x^2$ and lines $x = 1$ and $x = 4$ in the first quadrant is given by the integral _____. 2

16 Area of the circle $x^2 + y^2 = 9$ is given by the integral _____. 2

17 Order of the differential equation $\frac{d^2y}{dx^2} + (\frac{dy}{dx})^3 + y = 0$ is _____. 2

18 Integrating factor for the differential equation $\frac{dy}{dx} + 2y = \cos x$ is _____. 2

19 If $\vec{a} = \hat{i} - 2\hat{j} + \hat{k}$ and $\vec{b} = 3\hat{i} + 2\hat{j} - \hat{k}$ then $\vec{a} \cdot \vec{b} =$ _____. 2

20 If $\vec{a} = 5\hat{i} - \hat{j} + 3\hat{k}$ and $\vec{b} = 3\hat{i} + \hat{j} - 2\hat{k}$ then $|\vec{a} \times \vec{b}| =$ _____. 2

State as true or false from Q.No.21 to Q. No. 26 :

21 The perpendicular distance of the point $(2,5,-7)$ from XY-plane is 7 units. 2

22 Direction ratios of normal to the plane $2x + y - 3z = 10$ are $< 2,-1,3 >$. 2

23 Subject to the constraints $x + y \le 3,\ x \ge 0,\ y \ge 0$ maximum value of $Z = 2x + y$ is 6. 2

24 Subject to the constraints $x + y \le 5,\ x \ge 0,\ y \ge 0$ maximum value of $Z = x + 2y$ is 5. 2

25 If $P(A) = 0.3$ then $P(\bar{A}) = 0.6$. 2

26 If $P(A) = 0.5,\ P(A \cap B) = 0.2$ then $P(B|A) = 0.4$. 2

SECTION – B

27 Find the value of $4\tan^{-1}1 - \cos^{-1}\left(-\frac{1}{2}\right)$ 2

28 Form a matrix of order 2×2, $A = [a_{ij}]$ such that $a_{ij} = i + j$. 3

29 If $y = \cos 2x - \sin 5x$ then find $\frac{dy}{dx}$. 3

30 Evaluate $\int_0^1 \frac{1}{1+x^2}dx$. 3

31 Find the area of the region bounded by parabola $y^2 = x$ straight lines $x = 0,\ x = 3$, and x-axis in the first quadrant. 3

32 If $\vec{a} = 3\hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = 5\hat{i} + \hat{j} - 7\hat{k}$ then find $|\vec{a} \times \vec{b}|$ 3

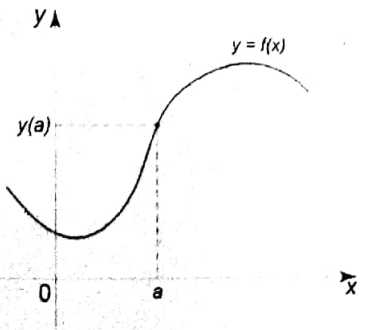
33 Find the vector and cartesian equations of the line that passes through the points $(3,-2,-5)$ and $(3,-2,6)$. 3

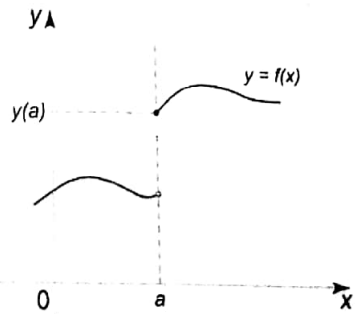
34 If $P(A) = \frac{6}{11}, P(B) = \frac{5}{11}$ and $P(A \cup B) = \frac{7}{11}$ then find $P(A \cap B)$. 3

SECTION – C

35 Give two examples each of (i) row matrix and (ii) square matrix. 4

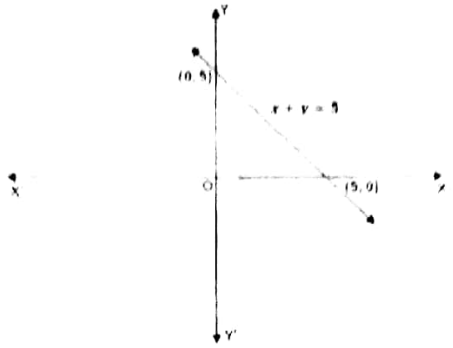
36 Which of the following graphs is of continuous functions and which are of discontinuous functions ? 4



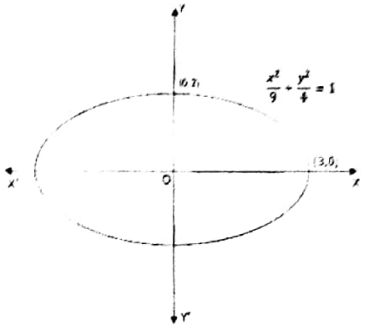


37 Give one example each of an increasing function and a decreasing function. 4

38 In the given figure shade the region bounded by the line $x + y = 5$, x-axis and y-axis. Also form the integral by which we can evaluate the area of shaded region. 4

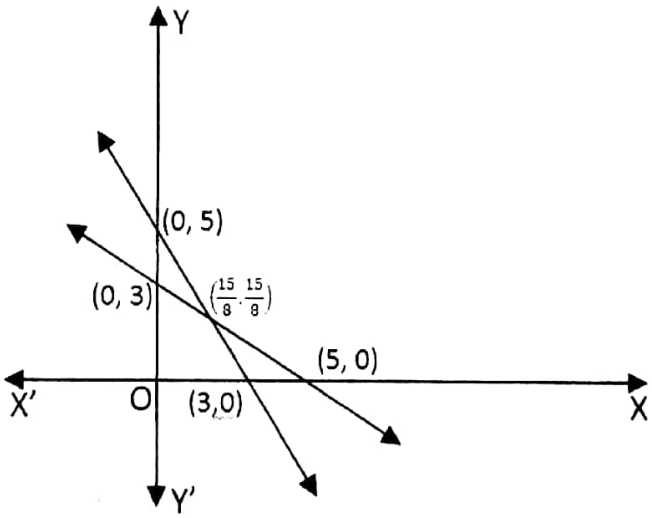


39 In the given figure shade the region enclosed by ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ in the first quadrant.
Also form the integral by which we can evaluate the area of shaded region. 4



40 Give one example each of (i) homogenous differential equation and (ii) first order linear differential equation. 4

41 Shade the feasible region in the given figure subject to the constraints
$5x + 3y \leq 15$, $3x + 5y \leq 15$, $x \geq 0$, $y \geq 0$. Also maximize $Z = 8x + 16y$ for the given graph. 4



42 Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that one of them is black and other is red. 4