SECOND REVISION TEST - 2024	11 - STD	
MATHEMATICS	Marks 90	Time 3.00 Hrs.

PART - I

Choose the correct answer. **20 x 1 = 20**

1. If n((A x B) ∩ (A x C) = 8 and n(B∩C) = 2 then n(A) is
 a) 6 b) 4 c) 8 d) 16

2. The solution 5x - 1 < 24 and 5x + 1 > -24 is
 a) (4, 5) b) (-5, -4) c) (-5, 5) d) (-5, 4)

3. The number of ways in which a host lady invite 8 people for a party of 8 out of 12 people of whome two do not want to attend the party together is
 a) $2 \times {}^{11}C_7 + {}^{10}C_8$ b) ${}^{11}C_7 + {}^{10}C_8$ c) ${}^{12}C_8 - {}^{10}C_6$ d) ${}^{10}C_6 + 2!$

4. The number of 5 digit numbers all digits of which are odd is
 a) 25 b) 5^5 c) 5^6 d) 625

5. The co -efficient of x^5 in the series e^{-2x} is
 a) $\frac{2}{3}$ b) $\frac{3}{2}$ c) $\frac{-4}{15}$ d) $\frac{4}{15}$

6. The slope of the line which makes an angle 45^0 with the line 3x – y = - 5 are
 a) 1, -1 b) $\frac{1}{2}, 2$ c) $1, \frac{1}{2}$ d) $2, \frac{-1}{2}$

7. If the points (x, – 2), (5 –2), (8, 8) are collinear, then x is equal to
 a) –3 b) $\frac{1}{3}$ c) 1 d) 3

8. If $\vec{a}+2\vec{b}$ and $3\vec{a}+m\vec{b}$ are parallel, then value of m is
 a) 3 b) $\frac{1}{3}$ c) 6 d) $\frac{1}{6}$

9. $\lim_{x\to 3}[x] =$ a) 2 b) 3 c) Does not exist d) 0

10. If f(x)= x + 2, then f^{I} (f(x)) at x = 4 is
 a) 8 b) 1 c) 4 d) 5

11. If $\vec{a}=3\hat{i}+\hat{j}+4\hat{k}$, $\vec{b}=\hat{i}-\hat{j}+\hat{k}$ then the area of the parallelogram is
 a) $\sqrt{41}$ Sq. units b) $\sqrt{42}$ Sq. units c) $\sqrt{43}$ Sq. units d) $\sqrt{44}$ Sq. units

12. $\lim_{x\to 0}(1+x)^{\frac{1}{x}} =$ a) e b) $\frac{1}{e}$ c) x d) $\frac{1}{x}$

13. $\int \frac{dx}{a^2-x^2} =$
 a) $\sin^{-1}\left(\frac{x}{a}\right)+c$ b) $\sin^{-1}\left(\frac{a}{x}\right)+c$ c) $\cos^{-1}\left(\frac{x}{a}\right)+c$ d) $\cos^{-1}\left(\frac{a}{x}\right)+c$

14. $\int \frac{\sqrt{\tan x}}{\sin 2x} dx =$ a) $\sqrt{\tan x} + c$ b) $2\sqrt{\tan x} + c$ c) $\frac{1}{2}\sqrt{\tan x} + c$ d) $\frac{1}{4}\sqrt{\tan x} + c$

15. The probability of the impossible event is
a) 1 b) 0 c) P(A) d) P(B)

16. Ten coins are tossed. The probability of getting atleast 8 heads is
a) $\frac{7}{64}$ b) $\frac{7}{32}$ c) $\frac{7}{16}$ d) $\frac{7}{128}$

17. If x = a, and sin θ, y = bcos θ then $\frac{d^2y}{dx^2}$ is
a) $\frac{a}{b^2}\sec^2\theta$ b) $\frac{-b}{a}\sec^2\theta$ c) $\frac{-b}{a}\sec^3\theta$ d) $\frac{-b^2}{a^2}\sec^3\theta$

18. The square root of $7 - 4\sqrt{3}$ is
a) $2+\sqrt{3}$ b) $2-\sqrt{3}$ c) $\sqrt{2}+3$ d) $\sqrt{2}-3$

19. If cos 28° + sin 28° = K^3 , then cos 17° is equal to
a) $\frac{k^3}{\sqrt{2}}$ b) $\frac{-k^3}{\sqrt{2}}$ c) $\pm\frac{k^3}{\sqrt{2}}$ d) $\frac{-k^3}{\sqrt{3}}$

20. In 3 fingers, the number of ways four rings can be worn in .... ways.
a) $4^3 - 1$ b) 3^4 c) 68 d) 64

PART - II

II. Answer any seven questions. Q.No.30 is compulsory. 7 x 2 = 14

21. If A = {1, 2, 3, 4} and B = {3, 4, 5, 6} find $n((A \cup B) X (A \cap B) X (A \Delta B))$.

22. Solve |2x - 17| = 3 for x.

23. Find the principal value of $\cos^{-1}\frac{\sqrt{3}}{2}$.

24. Find the middle term in the expansion $(x + y)^6$.

25. Find |A| if $A = \begin{bmatrix} 0 & \sin\alpha & \cos\alpha \\ \sin\alpha & 0 & \sin\beta \\ \cos\alpha & -\sin\beta & 0 \end{bmatrix}$

26. Find λ when the projection of $\vec{a} = \lambda\hat{i} + \hat{j} + 4\hat{k}$ on $\vec{b} = 2\vec{i} + 6\vec{j} + 3\vec{k}$ is units.

27. Find $\frac{dy}{dx}$ if $x^2 + y^2 = 1$.

28. Evaluate. $\int xe^x dx$

29. If two coins are tossed simultaneously, then find the probability of getting
i) one head and one tail ii) atmost two tails.

30. Evaluate $\lim_{x\to 3}\frac{x^2-5x+6}{x-3}$.

PART - III

III. Answer any seven questions. Q.No. 40 is compulsory. 7 x 3 = 21

31. In the set Z of of integers, define mRn if m - n is divisible by 7. Prove that R is an equivalences relation.

32. Resolve into partial fractions. $\frac{3x+1}{(x-2)(x+1)}$

33. Prove that : $\frac{\sin 4x+\sin 2x}{\cos 4x+\cos 2x}=\tan 3x$

34. If $nP_r = 720$; $nC_r = 120$, find n, r.

35. Find $\sqrt[3]{1001}$ approximately.

36. Find the value of the product $\begin{vmatrix}\log_3 64 & \log_4 3\\ \log_3 8 & \log_4 9\end{vmatrix} X \begin{vmatrix}\log_2 3 & \log_8 3\\ \log_3 4 & \log_3 4\end{vmatrix}$.

37. Prove that the points whose position vectors $2\vec{i}+4\vec{j}+3\vec{k}, 4\vec{i}+\vec{j}+9\vec{k}$, and $10\vec{i}-\vec{j}+6\vec{k}$ form a right angled triangle.

38. Evaluate: $\int(x-3)\sqrt{x+2}\,dx$

39. The probability of an event A occuring is 0.5 and B occuring is 0.3. If A and B are mutually exclusive event, then find the probability of

i) $p(A\cup B)$ ii $p(A\cap \overline{B})$) iii) $p(\overline{A}\cap B)$

40. Write any three different forms of an equations of straight line,

PART - IV

IV. Answer all the questions. 7 x 5 = 35

41. a) Let f, g : R → R be defined as f(x) = 2x - |x| and g(x) = 2x + |x|. Find *f o g*

(OR)

b) Find all the values of x that satisfies the equality $\frac{2x-3}{(x-2)(x-4)}<0$.

42. a) Derive projection formula from i) law of sines ii) Law of cosines

(OR)

b) By the principle of mathematical induction, Prove that for $n \geq 1$

$1.2 + 2.3 + 3.4 + \ldots\ldots\ldots (n+1) = \frac{n(n+1)(n+2)}{3}$

43. a) The 2nd, 3rd and 4th terms in the binomial expansion of $(x + a)^n$ are 240, 720 and 1080 for a suitable value of x. Find x, a and n.

(OR)

b) Rewrite $\sqrt{3}x + y + 4 = 0$ into normal form.

44. a) Show that $\begin{vmatrix} 2bc-a^2 & c^2 & b^2 \\ c^2 & 2ca-b^2 & a^2 \\ b^2 & a2 & 2ab-c^2 \end{vmatrix} = \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}^2$

(OR)

b) If ABCD is a quadrilateral and E and F are the midpoints of AC and BD respectively, then prove that $\vec{AB} + \vec{AD} + \vec{CB} + \vec{CD} = 4\vec{EF}$

45. a) Show that $\lim_{x \to 0^+} \left[\left\lfloor \frac{1}{x} \right\rfloor + \left\lfloor \frac{2}{x} \right\rfloor + \ldots\ldots\ldots + \left\lfloor \frac{15}{x} \right\rfloor \right] = 120$

(OR)

b) If $y = e^{\tan^{-1}x}$, show that $(1 + x^2)y^{11} + (2x - 1)y^1 = 0$.

46. a) integrate with respect to x $\int \frac{x+3}{(x+2)^2(x+1)} dx$

(OR)

b) There are two identical urns containing respectively 6 black and 4 red balls, 2 black and 2 red balls. An urn is chosen at random and a ball is drawn from it.

i) find the probability that the ball is black

ii) if the ball is black, what is the probability that it is from the first urn?

47. a) Integrate with respect to x $\int \frac{2x+1}{\sqrt{x^2+4x+9}}$

(OR)

b) If $y = (\cos^{-1}x)^2$ prove that $(1-x^2)\frac{d^2y}{dx^2} - \frac{dy}{dx} - 2 = 0$ Hence find y_2 when x = 0.