

## COMMON FIRST REVISION TEST - 2020

## STANDARD - XI

Time : 3.00 hrs

Mathematics

Marks: 90

Part - A

20 x 1 = 20

## I. Answer the following questions. (All)

- If  $n(A) = A$  and  $n(B \cap C) = 2$ , then  $n[(A \times B) \cap (A \times C)] = 8$  Find  $n(A) = ?$   
 a) 6                      b) 4                      c) 8                      d) 16
- The range of the function  $f(x) = |[x] - x|$ ,  $x \in \mathbb{R}$   
 a)  $[0, 1]$                       b)  $[0, \infty]$                       c)  $[0, 1)$                       d)  $(0, 1)$
- The solution of  $5x - 1 < 24$  and  $5x + 1 > -24$  is  
 a)  $(4, 5)$                       b)  $(-5, -4)$                       c)  $(-5, 5)$                       d)  $(-5, 4)$
- If  $\frac{Kx}{(x+2)(x-1)} = \frac{z}{x+2} + \frac{1}{n-1}$  then the value of K is .....  
 a) 1                      b) 2                      c) 3                      d) 4
- $\cos 1^\circ + \cos 2^\circ + \dots + \cos 179^\circ = \dots$   
 a) 0                      b) 1                      c) -1                      d) 89
- If  $\sin \alpha + \cos \alpha = b$ , then  $\sin 2\alpha$  is equal to  
 a)  $b^2 - 1$ , if  $b \leq \sqrt{2}$                       b)  $b^2 - 1$ ,  $> \sqrt{2}$                       c)  $b^2 - 1$ , if  $b \geq 1$                       d)  $b^2 - 1$ , if  $b \geq \sqrt{2}$
- The number of 5 digit numbers all digit which are odd is .....  
 a) 25                      b)  $5^5$                       c)  $5^6$                       d) 625
- $1+3+5+7+\dots+17$  the value is  
 a) 101                      b) 81                      c) 71                      d) 61
- The value of  $2 + 4 + 6 + \dots + 2n$  is  
 a)  $\frac{n(n-1)}{2}$                       b)  $\frac{n(n+1)}{2}$                       c)  $\frac{2n(2n+1)}{2}$                       d)  $n(n+1)$
- The remainder when  $38^{15}$  is divided by 13 is  
 a) 12                      b) 1                      c) 11                      d) 5
- The slope of the line which makes an angle  $45^\circ$  with the line  $3x - y = -5$  are  
 a) 1, -1                      b)  $1/2, -2$                       c) 1,  $1/2$                       d) 2,  $-1/2$
- The length of  $\perp$  from the origin to the line  $\frac{x}{3} - \frac{y}{4} = 1$ , is  
 a)  $(-3, -2)$                       b)  $(-3, 2)$                       c)  $(-2, -3)$                       d)  $(3, 2)$
- If  $A = \begin{bmatrix} a & x \\ y & a \end{bmatrix}$  and if  $xy = 1$ , then  $\det(A, A^T)$  is equal to  
 a)  $(a-1)^2$                       b)  $(a^2 + 1)^2$                       c)  $a^3 - 1$                       d)  $(a^2 - 1)^2$

14. Let A and B be two symmetric matrices of some order. Then which one of the following
- a) A+B is a symmetric matrix                      b) AB is symmetric  
 c)  $AB = (BA)^T$                       d)  $A^T B = AB^T$
15. If ABCD is a parallelogram, then  $\overline{AB} + \overline{AD} + \overline{CB} + \overline{CD}$  is equal to
- a)  $2(\overline{AB} + \overline{AD})$                       b)  $4\overline{AC}$                       c)  $4\overline{BD}$                       d)  $\overline{O}$
16.  $\lambda \vec{i} + 2\lambda \vec{j} + 2\lambda \vec{k}$  is a unit vector, then the value of  $\lambda$  is
- a) 1/3                      b) 1/4                      c) 1/9                      d) 1/2
17. If  $f(x) = x \tan^{-1} x$ , then  $f'(1)$  is
- a)  $1 + \frac{\pi}{4}$                       b)  $\frac{1}{2} + \frac{\pi}{4}$                       c)  $\frac{1}{2} - \frac{\pi}{4}$                       d) 2
18.  $\int \frac{\sqrt{\tan x}}{\sin 2x} dx =$
- a)  $\sqrt{\tan x} + c$                       b)  $2\sqrt{\tan x} + c$                       c)  $\frac{1}{2}\sqrt{\tan x} + c$                       d)  $\frac{1}{4}\sqrt{\tan x} + c$
19. A number is selected from the set  $\{1, 2, 3, \dots, 20\}$ . The probability that the selected number is divisible by 3 (or) 4 is
- a) 2/5                      b) 1/8                      c) 1/2                      d) 2/3
20. If it is given that the events A and B are such that  $p(A) = 1/4$ ,  $P(A/B) = 1/2$  and  $P(B/A) = 2/3$  then  $P(B)$  is
- a) 1/6                      b) 1/3                      c) 2/3                      d) 1/4

**Part - B**

II. Answer any 7 questions. Question No. 30 is compulsory.

7 x 2 = 14

21. Find the domain of  $\frac{1}{1 - 2\sin x}$
22. Solve  $\frac{x^2 - 4}{x^2 - 2x - 15} \leq 0$
23. Find the principal value of  $\sin^{-1} \left( \frac{\sqrt{3}}{2} \right)$
24. Prove that  $10C_2 + 2 \times 10C_3 + 10C_4 = 12C_4$
25. Expand  $\left( x^2 + \frac{1}{x^3} \right)^{10}$ . Find the coefficient of  $x^{15}$ .
26. Show that the lines are  $3x + 2y + 9 = 0$  and  $12x + 8y - 15 = 0$
27. Determine the value of X + Y if  $\begin{bmatrix} 2x+y & 4x \\ 5x-7 & 4x \end{bmatrix} = \begin{bmatrix} 7 & 7y-13 \\ y & x+6 \end{bmatrix}$

28. Show that the points whose position vectors  $2\vec{i} - 3\vec{j} - 5\vec{k}$ ,  $3\vec{i} + \vec{j} - 2\vec{k}$  and  $6\vec{i} - 5\vec{j} + 7\vec{k}$  are collinear.
29. Differentiate  $Y = \sin(x^2)$
30. Integrate:  $\frac{\cot x}{\sin x}$

## Part - C

III. Answer any seven questions. Question No.40 is compulsory

7 x 3 = 21

31. Find partial fraction  $\frac{x}{(x-1)^3}$
32. Simplify:  $16^{-3/4}$
33. Find the value of (i)  $\sin 150^\circ$  ii)  $\cos 135^\circ$
34. Find the value n is  $(n+2)P_4 = 42 \times nP_2$
35. Expand  $\left(2x - \frac{1}{2x}\right)^4$
36. Find a matrix  $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} = \begin{bmatrix} -7 & -8 & -9 \\ 2 & 4 & 6 \end{bmatrix}$
37. If P is position vectors  $\vec{OP} = \frac{n\vec{a} + m\vec{b}}{m+n}$  (Section Formula) - (Internal division)
38. Find the value is  $\lim_{x \rightarrow -2} (x^3 - 3x + 6) (-x^2 + 15)$
39. If  $y = \tan^{-1} \left( \frac{1+x}{1-x} \right)$  then find  $Y'$
40. Evaluate:  $\int \sqrt{1 + \sin 2x} dx$

## Part - D

IV. Answer all the questions:

7 x 5 = 35

41. Prove that  $\frac{\cot(180^\circ + \theta) \sin(90^\circ - \theta) \cos(-\theta)}{\sin(270^\circ + \theta) (\tan(-\theta) \operatorname{cosec}(360^\circ + \theta))} = \cos^2 \theta \cot^2 \theta$  (OR)

Find i)  $\cos 15^\circ$  ii)  $\tan 165^\circ$

42. Explain properties  $nC_r + nC_{r-1} = n+1C_r$  (OR)

Prove that  $24C_4 + \sum_{r=0}^4 (28-r) C_3 = 29C_4$  then prove that.

43. Prove that  $\begin{vmatrix} b+c & a-c & a-b \\ b-c & a+c & b-a \\ c-b & c-a & a+b \end{vmatrix} = 8abc$  (OR)

Prove that  $\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{vmatrix} = (x-y)(y-z)(z-x)$

44. Find the cosine and sine angle between the vectors  $\vec{a} = 2\vec{i} + \vec{j} + 3\vec{k}$  and  $\vec{b} = 4\vec{i} - 2\vec{j} + 2\vec{k}$   
(OR)

For any two vectors  $\vec{a}$  and  $\vec{b}$  prove that  $|\vec{a} \times \vec{b}|^2 + (\vec{a} \cdot \vec{b})^2 = |\vec{a}|^2 |\vec{b}|^2$

45. Prove that  $\lim_{x \rightarrow 0} x \left[ \frac{1}{x} + \frac{2}{x} + \dots + \frac{15}{x} \right] = 120$  (OR)

Find  $\frac{dy}{dx}$  then  $y = x^4 + x^2y^3 - y^5 + 2x + 1$

46. Evaluate  $\int \frac{x+3}{(x+2)^2(x+1)} dx$  (OR)

If  $P(A) = 0.6$ ,  $P(B) = 0.5$  and  $P(A \cap B) = 0.2$  then (i)  $P(A/B)$  (ii)  $P(\bar{A}/B)$

47. Differentiate i)  $Y = x^3 + 5x^2 + \frac{3x}{3} + 7$  ii)  $Y = e^x + \sin x + 2$  (OR)

Find the value is  $\lim_{x \rightarrow \infty} \frac{x^3 + 2x + 3}{(5x^2 + 1)}$