FIRST YEAR HIGHER SECONDARY SAMPLE QUESTION PAPER
2023
MATHEMATICS(SCIENCE)

Time:2hours
cool-off time :15 minutes

Maximum scores:60

(Answer any 6 questions from 1 to 8 ,each question carries 6 marks)

1. A={x:x is a prime number less than 10}.
   B={x:x is an integer , 0≤x≤6}.
   (i) Write **A** and **B** in Roster form. (1)
   (ii) Write $A \cap B$. (1)
   (iii) Write all subsets of $A \cap B$. (1)
2. (i) If (x+1,y-2)=(2,3) find the values of x and y . (1)
   (ii) Find the domain and Range of the relation.
   R={(x,y):y=x+1,x ϵ {0,1,2,3,4,5} (2)
3. Solve $\frac{5-2x}{3} \leqslant \frac{x}{6} - 5$ and show the solutions on a number line . (3)
4. (i) If ${}^{n}C_3 = {}^{n}C_6$ then n=…… (1)
   (ii) How many triangles can be drawn through 21 points on a circle . (2)
5. Consider the circle $x^2 + y^2 - 4x + 6y - 3 = 0$
   (i) Find the center and radius of the circle . (1)
   (ii) Find the equation of circle concentric with the circle and double its radius . (2)
6. (i) A point in the XZ- plane is……. (1)
   ((1,0,3), (2,-8,15) , (0,2,0) , (0,2,4) **)**
   (ii) Find the distance between the points (-1,2,-7) and (2,-4,-1) (2)
7. (i) $\lim_{x \to a} \left(\frac{x^n - a^n}{x - a}\right)$ =---------- (1)
   (ii) Find the limit $\lim_{x \to 1} \left(\frac{\sqrt{1+x} - 1}{x}\right)$ (2)

8. (i) Consider the experiment of tossing of 3 coins .Find the probability of

a) at least one head appears. (1)

b) exactly one tail appears. (1)

(ii) Write the number of possible outcomes if 8 dies are thrown at a time?(1)

(Answer any six questions from 9 to 16,each question carries 4 marks)

9. If **U**={1,2,3,4,5,6,7,8,9}, **A**={2,4,6,8}, **B**={2,3,5,7}

Verify that (i). $(A\cup B)^1=A^1\cap B^1$ (2)

(ii). $(A\cap B)^1=A^1\cup B^1$ (2)

10. (i) Draw the graph of the function $f(x)=|x-2|$ (2)

(ii) Write the domain and range of f. (1)

(iii) Find $f(1)+f(-1)$. (1)

11. (i)Find the value of i^9+i^{19} (2)

(ii) Express the following in the form a+ib (2)

$$\left(\frac{1}{3}+3i\right)^3$$

12. In how many ways can the letters of the word ***PERMUTATIONS*** be arranged if the

a) word start with P and end with S. (2)

b) vowels are all together. (2)

13. Find $(a+b)^4-(a-b)^4$ (2)

Hence evaluate $(\sqrt{3}+\sqrt{2})^4-(\sqrt{3}+\sqrt{2})^4$ (2)

14. Find the sum to n terms of the series 0.6+0.66+0.666+. . . . . (4)

15. Find the coordinate of foci ,vertices ,the length of major axis ,eccentricity and length of latusrectum of the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$. (4)

16. (i)If $P(A)=\frac{1}{3}$ then $P(A^1)$=---------- (1)

(ii) A and B are two events such that P(A)=.42, P(B)=0.48 and P(A and B)=0.16 Find (3)

(a) P(not A) (b). P(not B) (c). P(A or B)

(Answer any 3 questions from 17 to 20 ,each question carries 6 marks)

17 . Find mean and standard deviation for the following data . (6)

Classes	10-20	20-30	30-40	40-50	50-60
Frequencies	6	15	13	7	9

18. (i) 135^0=---------- radian . (1)

(ii) Prove that $\frac{\sin 5x+\sin 3x}{\cos 5x+\cos 3x}=\tan 4x$ (3)

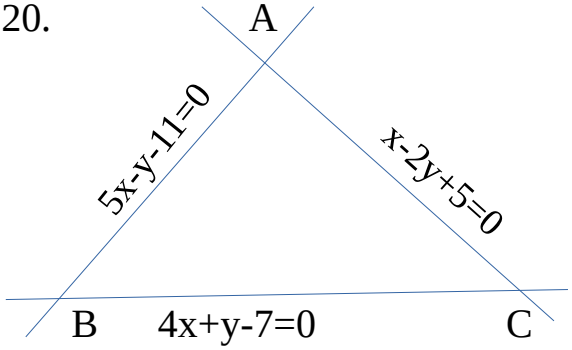
(iii) If $cosx=\frac{-3}{5}$,x lies in third quadrant find values of $sinx$ and $tanx$ (2)

19. (i) $\lim_{x\to 0} cosx$ =---------- (1)

(ii) Find the derivative of cosx by using first principle. (3)

(iii)Find the derivative of $\frac{x+sinx}{x^2}$. (2)

20.



(i) Find the coordinates of A,B,C ? (3)

(ii) Find the centroid of ΔABC ? (1)

(iii) Find the area of ΔABC? (2)

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