FIRST YEAR

Kerala Board Answer Key 2023



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ANSWER KEY

Code No	FY 451

FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2023

PART-I/II/III

SUBJECT : MATHEMATICS - COMMERCE

60 SCORES 2 HOURS

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
1	(i)	$A \cap B = \{2, 4\}$	1	
	(ii)	Subsets of $P = \phi, \{a\}, \{\{b\}\}, \{a, \{b\}\}$	2	3
		Remark: For each subset give ½ score		
2	(i)	$A = \{a, b\}$, $B = \{x, y\}$	1+1	
	(ii)	Domain of $R = \{a, b, c\}$	1	3
3	(i)	$2 - i$	1	
	(ii)	$\lvert\sqrt{3}\, i\rvert = \sqrt{0^2+(\sqrt{3})^2} = \sqrt{3}$	1	
	(iii)	$i^{21} = i^{20}\, i^1 = 1 \times i = i$	1	3
		Remark: (ii) $\lvert z\rvert = \sqrt{a^2+b^2}$ (½ Score) (i) $\bar{z} = a - ib$ (½ score) (iii) $i^2 = -1$ (½ Score)		
4		$5x - 3x \leq 2 - 4$ $2x \leq -2$ $x \leq -1$  	1½ ½ 1	3
5	(i)	$\frac{8!}{6!\,2!} = \frac{7 \times 8}{2} = 28$	½+½	
	(ii)	$n = 9$, A's – 4, L's – 2	1	
		Number of permutations $= \frac{9!}{4! \times 2!}$ $= 7560$	1	3
		Remark: $\frac{n!}{P_1!\,P_2! \cdots P_r!}$ give ½ score		

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Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
6	(i)	$4a = 16$ $a = 4$	1 ½	
		Equation of directrix : $x + 4 = 0$	½	3
	(ii)	Centre $= (5, 3)$, radius $= 5$	½ + ½	
		Remark: (i) Equation of directrix : $x + a = 0$ (½ score)		
7		$\lim_{x\to 1} \frac{x^9 - 1}{x^4 - 1} = \frac{\lim_{x\to 1} \frac{x^9-1}{x-1}}{\lim_{x\to 1} \frac{x^4-1}{x-1}}$	2	
		$= \frac{9 \times 1^8}{4 \times 1^3} = \frac{9}{4}$	1	3
		Remark: $\lim_{x\to a} \frac{x^n - a^n}{x-a} = n a^{n-1}$ give 1 score		
8	(i)	(d) 0	1	
	(ii)	$S = \{1, 2, 3, 4, 5, 6\}$		
		$A = \{2, 3, 5\}$	1	3
		$P(A) = \frac{3}{6} = \frac{1}{2}$	1	
		Remark $P(A) = \frac{n(A)}{n(S)}$ give ½ score		
9	(i)	$f(0) = 2 \times 0 - 5 = -5$	1	
	(ii)	(b) 1	1	
	(iii)	$(f+g)(x) = x^2 + 2x + 1$	1	4
	(iv)	$= (x+1)^2$ (b) $R - \{0\}$	1	
		Remark: $(f+g)(x) = f(x) + g(x)$ give ½ score		
10	(i)	$\cos x = \sqrt{1 - \sin^2 x} = \sqrt{1 - \frac{9}{25}} = \frac{4}{5}$	1 + ½	
		$\cos x = -\frac{4}{5}$ (second quadrant)	½	
	(ii)	$\sin 390° = \sin(360° + 30°)$	1	4
		$= \sin 30° = ½$	1	
11	(i)	$n = 2 + 8 = 10$	1	
	(ii)	Number of ways of selecting 2 spades $= {}^{13}C_2$	1	
		2 non spades $= {}^{39}C_2$	1	4
		Total number of ways $= {}^{13}C_2 \times {}^{39}C_2$	1	
		$= 57798$		
		Remark: ${}^{52}C_4$ give (1 score)		

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Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
12		$(100+x)^4 = 100^4 + {}^4C_1\,100^3x + {}^4C_2\,100^2x^2 + {}^4C_3\,100x^3 + x^4$	2	4
		$= 100^4 + 4\times100^3x + 60000x^2 + 400x^3 + x^4$	1½	
		$(101)^4 = (100+1)^4 = 100^4 + 4000000 + 60000 + 401$ $= 104060401$	½	
		Remark: Expansion of $(a+b)^n$ give 1 score Direct $(101)^4 = 104060401$ give ½ score		
13		$a=5,\ b=3$	½	4
	(i)	$c^2 = a^2 - b^2 \quad \therefore c = \sqrt{25-9} = 4$	1	
		foci $= (\pm 4, 0)$	½	
	(ii)	Vertices $= (\pm 5, 0)$	1	
	(iii)	Eccentricity $e = \frac{c}{a} = \frac{4}{5}$	½ + ½	
		Remark: For each formula give ½ score		
14	(i)	4th octant or XOY'Z octant	1	4
	(ii)	(c) 0	1	
	(iii)	distance $= \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2 + (z_2-z_1)^2}$	1	
		$= \sqrt{(-2)^2 + (+1)^2 + (+1)^2} = \sqrt{6}$	1	
15	(i)	$f'(x) = \frac{df}{dx} = 2x$	1	4
	(ii)	$f'(x) = \frac{dy}{dx} = \lim_{h\to0} \frac{f(x+h) - f(x)}{h}$	1	
		$= \lim_{h\to0} \frac{\sin(x+h) - \sin x}{h}$	1	
		$= \lim_{h\to0} \frac{2\cos\left(\frac{2x+h}{2}\right)\sin\frac{h}{2}}{h}$	½	
		$= \lim_{h\to0} \cos\left(\frac{2x+h}{2}\right)\frac{\sin\left(\frac{h}{2}\right)}{h/2}$	½	
		$= \cos x$		
		Remark: For direct answer $\cos x$ give 1 score $\sin x - \sin y = 2\cos\left(\frac{x+y}{2}\right)\sin\left(\frac{x-y}{2}\right)$ ½ score		

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Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
16				

x_i	f_i	cf	$\lvert x-M\rvert$	$f_i\lvert x_i-M\rvert$
3	3	3	10	30
6	4	7	7	28
9	5	12	4	20
12	2	14	1	2
13	4	18	0	0
15	5	23	2	10
21	4	27	8	32
22	3	30	9	27
	30			149

$2\frac{1}{2}$

Median $= \frac{13+13}{2} = 13$ — 1

MD $= \frac{1}{30} \times 149 = 4.97$ — $\frac{1}{2}$

Remark: Table up to cumulative frequency give 1 score

4

17	(i)	$a_5 = 2^5 + 1 = 33$	1	
	(ii)	$a_8 = ar^{8-1} = 1 \times 3^7 = 3^7 = 2187$	2	
	(iii)	$S_n = 8 + 88 + 888 + \dots$ n terms	$\frac{1}{2}$	
		$= 8(1 + 11 + 111 + \dots$ n terms$)$	$\frac{1}{2}$	
		$= \frac{8}{9}(9 + 99 + 999 + \dots$ n terms$)$	1	
		$= \frac{8}{9}(10 + 100 + 1000 + \dots - n)$	$\frac{1}{2}$	
		$= \frac{8}{9}\left(\frac{10(10^n - 1)}{9} - n\right)$	$\frac{1}{2}$	

6

Remark
(ii) $a_n = ar^{n-1}$ give $\frac{1}{2}$ score
(iii) $S_n = \frac{a(r^n-1)}{r-1}$ 1 score

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Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
18	(I)	$a = 3$, $b = 4$	1	
		The equation is $\frac{x}{3} + \frac{y}{4} = 1$	1	
	(II)	$y = 2x + \frac{3}{2}$	1	
		Slope $= 2$, y-intercept $= \frac{3}{2}$	½ + ½	
	(III)	Distance $= \left\lvert \frac{ax_1 + by_1 + c}{\sqrt{a^2 + b^2}} \right\rvert$	½	6
		$= \frac{2x-1+3x1+1}{\sqrt{2^2+3^2}}$	1	
		$= \frac{2}{\sqrt{13}}$	½	
		Remark (I) $\frac{x}{a} + \frac{y}{b} = 1$ (1 Score), using any method to get $4x + 3y = 12$ give 1½ score (II) $y = mx + c$ give ½ score		
19				

Class	f_i	x_i	$f_i x_i$	$x_i - \bar{x}$	$(x_i - \bar{x})^2$	$f_i (x_i - \bar{x})^2$
0 – 10	7	5	35	−20	400	2800
10 – 20	8	15	120	−10	100	800
20 – 30	10	25	250	0	0	0
30 – 40	8	35	280	10	100	800
40 – 50	7	45	315	20	400	2800
	40		1000			7200

		3	6
$\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{1000}{40} = 25$		1	
Variance $= \frac{1}{N} \sum f_i (x_i - \bar{x})^2$		½	
$= \frac{1}{40} \times 7200 = 180$		½	
Standard deviation $(\sigma) = \sqrt{180} = 13.416$		1	
Remark: For each formula give ½ score			

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Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
20	(i)	$P(A \text{ or } B) = P(A \cup B)$	½	6
		$= P(A) + P(B) - P(A \cap B)$	1	
		$= \frac{1}{3} + \frac{1}{2} - \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$	½	
	(ii)	$P(\text{not } A) = P(A') = 1 - P(A) = \frac{2}{3}$	½ + ½	
	(iii)	$P(\text{not } A \text{ and not } B) = P(A' \cap B') = P(A \cup B)'$	1½	
		$= 1 - P(A \cup B) = 1 - \frac{2}{3} = \frac{1}{3}$	½	
	(iv)	$P(A \text{ and not } B) = P(A \cap B') = P(A) - P(A \cap B)$	½	
		$= \frac{1}{3} - \frac{1}{6} = \frac{1}{6}$	½	

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