MARKING SCHEME

CUMULATIVE EXAM Session 2022-23

Class XI

Mathematics (Code-041)

1.	C	1
2.	D	1
3.	B	1
4.	B	1
5.	C	1
6.	D	1
7.	B	1
8.	A	1
9.	B	1
10.	D	1
11.	C	1
12.	A	1
13.	C	1
14.	B	1
15.	C	1
16.	D	1
17.	D	1
18.	C	1
19.	A	1
20.	D	1
21.	For correct $A - B$ For correct $A \cap B'$ For verification	½ 1 ½
22	Getting standard form: $z = \frac{5+2i}{3+i} = \frac{5+2i}{3+i} \times \frac{3-i}{3-i}$ $z = \frac{17}{10} + \frac{1}{10}i = \frac{1}{10}(17 + i)$ $z^{-1} = \frac{10}{17+i} = \frac{10}{17+i} \times \frac{17-i}{17-i}$ $z^{-1} = \frac{17}{29} - \frac{1}{29}i$	½ 1/2 1/2 1/2

23	Average marks=(145+x)/3 (145+x)/3>=60 x>=25 OR 6-3x>=2-2x -x>=-4 x<=4 (-∞,4)	1 ½ ½ ½ ½ ½ ½
24	Nubmer of ways to arrange vowels together=3! Required number of different words 6 ! × 3 ! = 4320	½ 1.5
25	For applying binomial theorem to expand For simplifying and correct expansion	1 1
26	$A\cup B = A\cup C$ Taking both sides intersection with B $B\cap (A\cup B) = B \cap (A\cup C)$ $B= (B \cap A)\cup (B \cap C)$ $B=(A\cap C) \cup (B \cap C)$ $B=(A\cup B) \cap C$ $B= (A\cup C) \cap C$ B=C	 ½ ½ ½ ½ ½ 1/2
27	y=13-2x at x=1, 2,3 value of y=11,9,7 which do not belong to A R={(4,5),(5,3),(6,1)} Domain={4,5,6} Range={1,3,5}	 1 1 ½ 1/2
28.	$\frac{2sin3x\ cos2x-2sin3x}{-2sin3x\ sin2x}$ $= \frac{cos2x-1}{-sin2x}$ $= \frac{2sin^2x}{2sinx\ cosx}$ = tan x **OR** $3x - \sin sin\ x) + \sin sin\ 2x$. $2\cos cos\ 2x \sin sin\ x + 2\sin sin\ x \cos cos\ x$. $2\sin sin\ x(\cos cos\ 2x + \cos cos\ x)$. $4\sin sin\ x \cos cos\ \frac{x}{2}\ \ \cos cos\ \frac{3x}{2}$	1 1/2 1 ½ ½ 1 ½ 1
29	$\times\ G_1 \times G_2 \times G_3 \times G_4 \times G_5 \times G_6 \times$ Arrangements of 6 girls at 6 places marked by G=6!=720 Arrangements of 4 boys at 7 places marked by ×= $7_{P_4} = 840$ Total number of ways = 720 X 840 = 604800	½ ½ 1 1
29	(i)Committee of 3 persons can be made in 5_{C_3} ways = 10 ways	1 ½+1/2 1

	(ii)1 man can be selected in 2_{C_1} ways and 2 women can be in 3_{C_2} ways Therefore, required number = $2_{C_1} \times 3_{C_2} = 6$	
30	$x^3-3xy^2+i(3x^2y-y^3)=u+iv$ $u=x^3-3xy^2$ and $v=3x^2y-y^3$ For correct proof	1.5 ½ 1
31.	$(x+1)^6 + (x-1)^6=2\left(x^6 + 15x^4 + 15x^2 + 1\right)$ $(\sqrt{2} + 1)^6 + (\sqrt{2} - 1)^6 = 198$	2 1
32(a)	$9 - x^2 \geq 0 \Rightarrow x^2 \leq 9$ $-3 \leq x \leq 3$ Writing: Domain= $[-3, 3]$ Finding: $x = \sqrt{9 - y^2}$ ● Finding: $-3 \leq y \leq 3 \Rightarrow 0 \leq y < 3$ (since y is positive-by the question Range =[0,3]	½ 1/2 1/2 ½ ½
32(b)	$x + 5 \neq 0$ $x \neq -5$ Domain=**R**-{-5} y=f(x) and getting x=$\frac{3+5y}{2-y}$ $2 - y \neq 0$, y$\neq 2$ $Range = R - \{2\}$	½ ½ ½ ½ ½
33.	LHS = $cos10^0. cos50^0. cos60^0. cos70^0$ $=\frac{2}{2}cos10^0. cos50^0. \frac{1}{2}. cos70^0$ $= \frac{1}{4}\left[cos40^0 + cos60^0\right]. cos70^0$ $= \frac{1}{4}[cos70^0. cos40^0 + \frac{1}{2} cos70^0]$ $= \frac{1}{8}[2. cos70^0. cos40^0 + cos70^0]$ $= \frac{1}{8}[cos110^0 + cos30^0 + cos70^0]$ $= \frac{1}{8}[cos(180^0 - 70^0) + cos30^0 + cos70^0]$ $= \frac{1}{8}\left[- cos70^0 + \frac{\sqrt{3}}{2} + cos70^0\right]$ $= \frac{\sqrt{3}}{16}$ =R.H.S.	1/2 1 1 1 1/2 1
OR 33	$\cos cos\, 3A = 4 cos^3 A - 3 \cos cos\, A$ $cos^3 A = \frac{1}{4}(\cos cos\, 3A + 3 \cos cos\, A)$ Now LHS= $\frac{1}{4}[\cos cos\, 3A + 3 \cos cos\, A + cos\left(360^0 + 3A\right) + 3cos\left(120\right.$]	½ ½ 1/2 1/2 1

	$= \frac{1}{4}[\cos cos\ 3A + 3\cos cos\ A + cos3A + 3cos(120^0 + A) +$ $]$ $= \frac{3}{4}\cos cos\ 3A + \frac{3}{4}[\cos cos\ A + cos(120^0 + A) + cos(240^0$ $]$ $= \frac{3}{4}\cos cos\ 3A + \frac{3}{4}[\cos cos\ A + 2cos(180^0 + A)\ cos60^0]$ $= \frac{3}{4}\cos cos\ 3A$	1 1

34	Let x litres of 2% acid solution is required to be added then total mixture= x+1280 litres Formation of inequality: $2x + 2560 < x + 5120$ Formation of inequality: $x + 5120 < 3x + 3840$ Solving above inequalities to get: $640 < x < 2560$	½ 1.5 1.5 1.5
35	Correct expansion of $(1 + 2x)^6$ Correct expansion of $(1 - x)^7$ Required coefficient=171 OR $T_r = {}^nC_{r-1}\, x^{r-1}$ $T_{r+1} = {}^nC_r\, x^r$ $T_{r+2} = {}^nC_{r+1}\, x^{r+1}$ ${}^nC_{r-1} : {}^nC_r : {}^nC_{r+1} = 6 : 33 : 110$ 6n-39r+6 = 0…………………. (i) 3n-13r-10 = 0…………………(ii) Solving (i) and (ii) we get n=12	1.5 1.5 2 ½ ½ ½ ½ 1 1 1
36	A={I,L,O,V,E,M,A,T,H,C,S} B={I,L,O,V,E,S,T,A,C} (i)B (ii)A (iii)∅ OR 512	1 1 2
37	(i) -5/13 (ii) -119/169 (iii) $\frac{3}{\sqrt{13}}$ $or\ -3/2$	1 1 2
38	(i) 20x7! (ii)12x7! Or 5!x5!	2 2