KENDRIYA VIDYALAYA SANGATHAN, LUCKNOW REGION
SESSION ENDING EXAM (2023-24)
CLASS: XI
SUBJECT: MATHEMATICS
MARKING SCHEME

SECTION-A

1	2	3	4	5	6	7	8	9	10
C	B	A	B	A	D	D	B	B	A
11	12	13	14	15	16	17	18	19	20
D	C	B	A	B	B	C	C	A	D

SECTION-B

21	Forming correct relation between a and b	0.5
	a=2	1
	b=-1	0.5
22	For each correct answer	0.5
23	tan5x=tan(3x+2x)	0.5
	$tan\,5x = \dfrac{tan\,3x + tan\,2x}{1 - tan\,3x.\,tan\,2x}$	0.5
	Cross multiplication and correct proof	1
24	Taking 4I's as one object and ways to arrange them=1	0.5
	Total number of object taking 4I's as single object=8 in which 4S and 2P	0.5
	Number of distinct permutations=$\dfrac{8!}{4!2!}$	0.5
	=840	0.5
	OR	
	Total number of vowels and consonant =5 , 4	0.5
	Number of ways to select 2 vowels and 3 consonant=C(5,2)xC(4,3)	0.5
	Total number of required words= C(5,2)xC(4,3)x5!	0.5
	=4800	0.5
25	$\lim\limits_{x\to 0}\dfrac{1-cos\,x}{sin\,x}$	0.5
	$\lim\limits_{x\to 0}\dfrac{sin\,x}{1+cos\,x}$	1
	0	0.5

SECTION-C

26	1-x>0 i.e. x<1	0.5
	Domain=(-∞,1)	0.5
	Let y=f(x) and getting 1-x=$\dfrac{1}{y^2}$	1
	Range=(0, ∞)	1
	OR	

	$2x-5\neq0$ $x\neq5/2$ **Domain=R-{5/2}** **Let y=f(x) and getting x=$\frac{5y-2}{2y-3}$** **Range=R-{3/2}**		0.5 0.5 1 1
27	$$\frac{(1+2i)(1+i)}{2}$$ $$\frac{-1-3i}{2}$$ $$x=-\frac{1}{2}, y=-\frac{3}{2}$$ **x+y=-2**		0.5 1 1 0.5
28	$$x+x+3+2x \leq 111$$ $$x \leq 27$$ $$2x \geq x+3+5$$ $$x \geq 8$$ **Length of shortest piece 8 to 27**		1 0.5 0.5 0.5 0.5
29	$6^n=(1+5)^n$ **For correct binomial expansion** **Expressing $6^n-5n-1=25\alpha$ for some natural value of α** **OR** $$C(5,0)(x^2)^5+C(5,1)(x^2)^4(\frac{3}{x})^1+C(5,2)(x^2)^3(\frac{3}{x})^2+C(5,3)(x^2)^2(\frac{3}{x})^3$$ $$+C(5,4)(x^2)^1(\frac{3}{x})^4+C(5,5)(\frac{3}{x})^5$$ $$x^{10}+15x^7+90x^4+270x+\frac{405}{x^2}+\frac{243}{x^5}$$		0.5 1.5 1 1.5 1.5
30	**6h+4k=11** **h-3k=11** **h=7/2, k=-5/2** **r²=65/2** **x²+y²-7x+5y-14=0** **OR** **For correct figure** **For correct equation of parabola** **4a=125/3** **For correct length =43.1**		1.5 0.5 1 1 1 0.5 1 0.5 1
31	**For applying correct distance formula** **Transferring one square root term and correct squaring** **4x²+3y²+4z²=300**		1 1 1

SECTION-D

32	**Correct expression in terms of cos 2x**	**1**
		1
	$\frac{3}{2} - [cos\,2x + cos\left(2x + \frac{2\pi}{3}\right) + cos(2x - \frac{2\pi}{3})]$	
	$\frac{3}{2} - [cos\,2x + 2cos2x\,cos\frac{2\pi}{3})]$	**1**
	$\frac{3}{2} - [cos\,2x - cos2x\,]$	**1**
	$3/2$	**1**
33	$$a + b = 10\sqrt{ab}$$	**0.5**
	$$\frac{(\sqrt{a} + \sqrt{b})^2}{(\sqrt{a} - \sqrt{b})^2} = \frac{3}{2}$$	**1.5**
	$$\frac{\sqrt{a} + \sqrt{b}}{\sqrt{a} - \sqrt{b}} = \frac{\sqrt{3}}{\sqrt{2}}$$	**1**
	$$\frac{\sqrt{a}}{\sqrt{b}} = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$$	**1** **1**
	Squaring and for correct proof	**0.5**
	OR	**0.5**
	a+b=3, ab=p	**2**
	c+d=12,cd=q	**2**
	correct common ratio=2	
	for correct proof	
34	(a)$\lim\limits_{x\to 0}\frac{(2sin\,3xcos\,2x + 2sin3x)}{x}$	**1**
	$\lim\limits_{x\to 0}\frac{2sin\,3x(cos\,2x + 1)}{x}$	**1**
	12	**1**
	(b)For correct application of quotient rule	**1**
	For correct answer	**1**
	OR	
	For correct formula of first principle	**1**
	$$\frac{d}{dx}f(x) = \lim\limits_{x\to 0}\frac{\sqrt{sin(3x + 3h)} - \sqrt{sin3x}}{h}$$	**1**
		1
	$=\lim\limits_{x\to 0}\frac{sin(3x+3h) - sin3x}{h.2\sqrt{sin3x}}$	**1**
	$=\lim\limits_{x\to 0}\frac{2cos\left(3x+\frac{3h}{2}\right)sin\frac{3h}{2}}{h.2\sqrt{sin3x}}$	**1**
	$=\frac{3}{2}\frac{cos\,3x}{\sqrt{sin\,3x}}$	
35	**For correct formation of table**	**1.5**
	Mean=107	**1**
	Variance=2276	**2**
	SD=47.71	**0.5**

SECTION-E

36	(a)-1/2 (b)x-2y+4=0 (c)(4,4)	1 2 1
37	(a)C(8,3)xC(6,2) 840 (b)C(8,4)xC(6,1) 420 Or C(8,5) 56	1 1 1 1 1 1
38	21/25 4/25 3/25	1 2 1