

Directorate of Government Examinations, Chennai – 600 006
Higher Secondary First Year Public Examination – May 2022
Mathematics Marking Scheme – English Medium

GENERAL INSTRUCTIONS

Maximum Marks : 90

1. The answers given in the marking scheme are Text book bound.
2. If a student has given any answer which is different from one given in the marking scheme, but carries the prescribed content meaning (rigorous) such answers should be given full credit with suitable distribution.
3. Follow the footnotes which are given under certain answer schemes.
4. If a particular stage is wrong and if the candidate writes the appropriate formula then award 1 mark for the formula (for the stage mark 2*). This mark (*) is attached with that stage. This is done with the aim that a student who did the problem correctly without writing the formula should not be penalized.
5. In the case of Part II, Part III and Part IV, if the solution is correct then award full mark directly. The stage mark is essential only if the part of the solution is incorrect.
6. Answers written only in Black or Blue ink should be evaluated.

PART – I

1. One mark to write the correct option and the corresponding answer.
2. If one of them (answer or option) is wrong, then award zero mark only.

CODE A			CODE B		
Q.NO	OPTION	ANSWER	Q.NO	OPTION	ANSWER
1.	(d)	discontinuous	1.	(c)	$\frac{2}{3}$
2.	(d)	$A + B$ is symmetric	2.	(d)	$1 - 2^{-n}$
3.	(b)	e^4	3.	(a)	$2x^2e^{\frac{x}{2}} - 8xe^{\frac{x}{2}} + 16e^{\frac{x}{2}} + c$
4.	(d)	18	4.	(c)	N
5.	(c)	10	5.	(b)	e^4
6.	(c)	N	6.	(d)	∞
7.	(c)	does not exist	7.	(d)	discontinuous
8.	(d)	∞	8.	(d)	5^5
9.	(c)	$\frac{2x^3}{3} - x^2 + x + c$	9.	(b)	$-2\hat{i} - \hat{j} + 9\hat{k}$
10.	(a)	0.56	10.	(a) $\sec\theta$ (or) (c) $\sec(-\theta)$	
11.	(a) $\sec\theta$ (or) (c) $\sec(-\theta)$		11.	(c)	8
12.	(b)	$-2\hat{i} - \hat{j} + 9\hat{k}$	12.	(d)	8
13.	(a)	$2x^2e^{\frac{x}{2}} - 8xe^{\frac{x}{2}} + 16e^{\frac{x}{2}} + c$	13.	(c)	does not exist
14.	(d)	5^5	14.	(d)	$\frac{1}{2}, -2$
15.	(c)	$\frac{2}{3}$	15.	(a)	0.56
16.	(d)	$\frac{1}{2}, -2$	16.	(c)	10
17.	(d)	$\vec{b} - \vec{a}$	17.	(d)	$A + B$ is symmetric
18.	(d)	8	18.	(d)	$\vec{b} - \vec{a}$
19.	(c)	8	19.	(d)	18
20.	(d)	$1 - 2^{-n}$	20.	(c)	$\frac{2x^3}{3} - x^2 + x + c$

Important Note for Part-II, Part – III and Part – IV

In an answer to a question, between any two particular stages of marks greater than one) if a student starts from a stage with correct step but reaches the next stage with a wrong result then suitable credits should be given to the related steps instead of denying the entire marks meant for the stage.

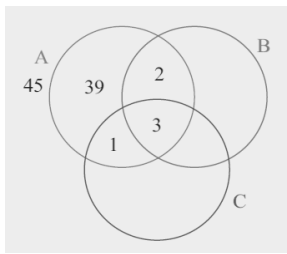
PART – II

Q.NO	CONTENT	MARKS
21.	$2x - 17 = \pm 3$	1
	$x = 10$ (or) $x = 7$	1
22.	$\sin 50^\circ + \sin 20^\circ = 2 \sin \frac{50^\circ + 20^\circ}{2} \cos \frac{50^\circ - 20^\circ}{2}$	1
	$= 2 \sin 35^\circ \cos 15^\circ$	1
23.	$\cos 135^\circ = -\frac{1}{\sqrt{2}}$	2
24.	$2^5 = 32$	2
25.	$a_1 = 1, a_2 = 2, a_3 = 3$	1
	$a_4 = 6$	1
26.	$2x + 3y - 5 = 0$	2*
27.	$ A = 0$	2
28.	$\frac{5\hat{i} - 3\hat{j} + 4\hat{k}}{\sqrt{50}}$	2*
29.	$\frac{dy}{dx} = 3x^2 + 10x + 3$	2
30.	$\frac{(x - 11)^8}{8} + c$	2

PART – III

Q. NO	CONTENT	MARKS
31.	$n(A) = 4$ $n(\wp(A)) = 2^4 = 16$	2 1
32.	$\frac{x}{(x+3)(x-4)} = \frac{A}{x+3} + \frac{B}{x-4}$ $= \frac{3/7}{x+3} + \frac{4/7}{x-4}$	1 2
33.	This word has 13 letters $\frac{13!}{2! \times 2! \times 3!}$	1 2
34.	$(x+2)^{-2/3} = 2^{-2/3} \left(1 + \frac{x}{2}\right)^{-2/3}$ $= 2^{-2/3} \left(1 - \frac{x}{3} + \frac{5x^2}{36} - \frac{5}{81}x^3 + \dots\right)$	1 2
35.	$D = \left \frac{5(1) + 12(2) - 3}{\sqrt{(5)^2 + (12)^2}} \right $ $= 2$	2* 1
36.	$\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{vmatrix} = \begin{vmatrix} 1 & 0 & 0 \\ x & y-x & z-x \\ x^2 & y^2-x^2 & z^2-x^2 \end{vmatrix} \begin{matrix} c_2 \rightarrow c_2 - c_1 \\ c_3 \rightarrow c_3 - c_1 \end{matrix}$ $= (x-y)(y-z)(z-x)$ Note: One can do by different methods	2 1
37.	$\cos \theta = \frac{2}{\sqrt{50}\sqrt{101}}$ $\theta = \cos^{-1} \left[\frac{\sqrt{2}}{5\sqrt{101}} \right]$	2* 1
38.	$2x + 2y \frac{dy}{dx} = 0$ $\frac{dy}{dx} = \frac{-x}{y}$	1 2
39.	$f(x) = 2x^2 - 5x + c$ $c = 3$ $f(x) = 2x^2 - 5x + 3$	1 1 1
40.	$A = \{2,4,6\}, B = \{6\}$ and $A \cap B = \{6\}$ $P(B/A) = \frac{1}{3}$	1 2*

PART – IV

Q. NO	CONTENT	MARKS
41.(a)	 <p>The number of persons who knows only language A $= 5000 \times \frac{39}{100}$ $= 1950$</p> <p>Note : This problem can be done by property of cardinality</p>	<p>3</p> <p>1</p> <p>1</p>
OR		
41.(b)	$I = \int \frac{d(x^2 + 4x + 6)}{x^2 + 4x + 6}$ $= \log x^2 + 4x + 6 + c$ <p>Note: One can do this problem by substitution method</p>	<p>2</p> <p>3</p>
42.(a)	$\frac{\cot \theta \cos \theta \cos \theta}{(-\cos \theta)(-\tan \theta) (\operatorname{cosec} \theta)}$ $= \frac{\cot \theta \cos^2 \theta}{(\cos \theta) \left(\frac{\sin \theta}{\cos \theta}\right) \left(\frac{1}{\sin \theta}\right)}$ $= \cos^2 \theta \cot \theta$	<p>2</p> <p>2</p> <p>1</p>
OR		
42.(b)	$u = x, dv = \cos x \, dx$ $v = \sin x$ $\int x \cos x \, dx = x \sin x - \int \sin x \, dx$ $= x \sin x + \cos x + c$	<p>1</p> <p>1</p> <p>2*</p> <p>1</p>
43.(a)	<p>$P(1)$ is true.</p> <p>Assuming $P(k)$ is true.</p> <p>$P(k + 1)$ is true.</p> <p>Remaining part.</p>	<p>1</p> <p>1</p> <p>2</p> <p>1</p>
OR		

43.(b)	$\frac{dx}{dt} = a(1 - \cos t)$	2
	$\frac{dy}{dt} = a \sin t$	2
	$\frac{dy}{dx} = \frac{\sin t}{1 - \cos t}$	1
44.(a)	$a = 12, h = k, b = 2, 2g = 11, 2f = -5, c = 2$	1
	$48 - \frac{55k}{2} - \frac{300}{4} - \frac{242}{4} - 2k^2 = 0$	2*
	$k = -5$ (or) $k = \frac{-35}{4}$	2
OR		
44.(b)	$\lim_{x \rightarrow 0} \frac{\sin 2x}{\cos 2x (\sin 5x)}$	1
	$= \lim_{x \rightarrow 0} \frac{\frac{\sin 2x}{2x} \times 2x}{\frac{\sin 5x}{5x} \times 5x}$	2
	$= \frac{2}{5}$	2
45.(a)	$\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} \times (-1) \begin{vmatrix} a & b & c \\ c & a & b \\ b & c & a \end{vmatrix}$	2
	$= \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} \times \begin{vmatrix} -a & -b & -c \\ c & a & b \\ b & c & a \end{vmatrix}$	1
	$= \begin{vmatrix} 2bc - a^2 & c^2 & b^2 \\ c^2 & 2ca - b^2 & a^2 \\ b^2 & a^2 & 2ba - c^2 \end{vmatrix}$	2
OR		
45.(b)	$\log 75 - \log 16 - 2 \log 5 + 2 \log 9 + \log 32 - \log 243$	2
	$= \log 3 + \log 25 - \log 16 - \log 25 + \log 81$	2
	$+ \log 16 + \log 2 - \log 81 - \log 3$	1
	$= \log 2$	
46.(a)	$AB = 7, BC = 7$ and $CA = \sqrt{98}$	1+1+1
	$AB^2 + BC^2 = CA^2$	1
	\therefore The given points form a right angled triangle.	1
OR		

46.(b)	$\cos 15^\circ = \frac{\sqrt{3} + 1}{2\sqrt{2}}$ $\tan 165^\circ = \frac{\tan 120^\circ + \tan 45^\circ}{1 - \tan 120^\circ \tan 45^\circ}$ $= \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$	<p>2</p> <p>1</p> <p>2</p>
47.(a)	$P(B/A_1) = \frac{6}{10}, \quad P(B/A_2) = \frac{2}{4}$ <p>i) $P(B) = \frac{11}{20}$</p> <p>ii) $P(A_1/B) = \frac{6}{11}$</p>	<p>1</p> <p>2*</p> <p>2*</p>
OR		
47.(b)	$\frac{-\sqrt{3}}{2}x + \frac{1}{2}y = 2$ $p = 2 \text{ and } \alpha = 150^\circ = \frac{5\pi}{6}$ $x \cos \frac{5\pi}{6} + y \sin \frac{5\pi}{6} = 2$	<p>2*</p> <p>1+1</p> <p>1</p>