BOARD OF SCHOOL EDUCATION HARYANA
Practice Paper -XI
(2025-26)
Marking Scheme
MATHEMATICS

CODE: 835

⇨ Important Instructions: ● All answers provided in the Marking scheme are SUGGESTIVE
● Examiners are requested to accept all possible alternative correct answer(s).

	SECTION – A (1Mark × 20Q)	
Q. No.	**EXPECTED ANSWERS**	**Marks**
Question 1.	If A= {a, b, c, d, e} and B= {d, e, f, g} then (A-B) ∩ (B-A) is	
Solution:	(A) ∅	**1**
Question 2	If U = {1,2,3,4,5,6,7,8,9}, A = {1,3,5,7,9}, B = {2,4,6,8}, then $(A \cup B)'$ is	
Solution:	(B) { }	**1**
Question 3	$\frac{5\pi}{3}$ in degree measure is :	
Solution:	(B) 300°	**1**
Question 4.	a + ib form of $i^9 + i^{19}$ is :	
Solution:	(c) 0 + i0	**1**
Question 5.	If $\frac{1}{8!} + \frac{1}{9!} = \frac{X}{10!}$ then value of x is:	
Solution:	(A) 100	**1**
Question 6.	20^{th} term of the G.P. $\frac{5}{2}, \frac{5}{4}, \frac{5}{8}$, ….. is :	
Solution:	(B) $\frac{5}{2^{20}}$	**1**
Question 7.	The value of x for which the numbers -3/11, x, -11/3 are in G.P	
Solution:	(B) ±1	**1**
Question 8.	The derivative of cos (x - a) is:	
Solution:	(C) –sin (x - a)	**1**
Question 9.	If the standard deviation of a data is 5, then its variance is:	
Solution:	(A) 25	**1**
Question10.	If A and B are two mutually exclusive events then,	
Solution:	(A) A ∩ B = ∅	**1**
Question11.	Find the number of terms in the expansion of $(2x - 5)^8$.	
Solution:	8 + 1 = 9	**1**
Question12.	Find the equation of the circle with centre (-2, 3) and radius 4.	

Solution:	$(x+2)^2 + (y-3)^2 = 16$ or $x^2 + y^2 + 4x - 6y - 3 = 0$	**1**
Question13.	Write the value of $\lim_{x \to 4} \frac{4x+3}{x-2}$.	
Solution:	$\lim_{x \to 4} \frac{4x+3}{x-2} = \frac{4.(4)+3}{4-2} = \frac{19}{2}$	**1**
Question14.	If v is the variance and σ is the standard deviation, then what is the relation between v and σ .	
Solution:	$v^2 = \sigma$	**1**
Question15.	Fill in the blank to make the statement true, $\emptyset' \cap A = \ldots\ldots\ldots\ldots$	
Solution:	$\emptyset' \cap A = U$	**1**
Question16.	tan (A - B) is equal to …………….. .	
Solution:	$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A . \tan B}$	**1**
Question17.	${}^nC_r = \frac{n!}{(n-r)!}$. (True/ False)	
Solution:	False	**1**
Question18.	If a bag has only red balls, the probability of picking a blue ball is 1. (True/ False)	
Solution:	False	**1**
Question19.	**Assertion (A):** Let A={1,2} and B={3,4}.Then, number of relations from A to B is 16. **Reason (R):** If n (A) = p and n (B) = q, then number of relations from A to B is 2^{pq} .	
Solution:	(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)	**1**
Question20.	**Assertion (A):** The point (3, 0, -5) lies on the XZ plane. **Reason(R):**The coordinates of a point P(x, y, z) in XZ plane are (0, 0, z).	
Solution:	(C) Assertion (A) is true and Reason (R) is false.	**1**
	SECTION – B (2Marks × 5Q)	
Question21.	List all te subsets of the set { -1, 0 , 1 }.	
Solution:	Let A = { -1, 0 , 1 } So, all the subsets of the set A are ∅,{-1},{0},{1},{-1,0},{0,1},{-1, 1}, {-1, 0, 1}	**2**
Question22.	Find the multiplicative inverse of $\sqrt{5} + 3i$.	
Solution:	Multiplicative Inverse of $\sqrt{5} + 3i = \frac{1}{\sqrt{5} + 3i}$ ⇨ M.I. $= \frac{1}{\sqrt{5} + 3i} \times \frac{\sqrt{5} - 3i}{\sqrt{5} - 3i}$ ⇨ $= \frac{\sqrt{5} - 3i}{(\sqrt{5})^2 - (3i)^2}$ ⇨ $= \frac{\sqrt{5} - 3i}{5 - 9i^2}$	**1**

	⇨ $= \frac{\sqrt{5}-3i}{5+9} = \frac{\sqrt{5}}{14} - \frac{3i}{14}$	**1**
OR Question22.	Express $(1 - i)^4$ in the form of a + ib.	
Solution:	Given $(1 - i)^4$ ⇨ $= (1 - i)^2.(1 - i)^2$ ⇨ $= (1 + i^2 - 2i).(1 + i^2 - 2i)$ ⇨ $= (1 - 1 - 2i).(1 - 1 - 2i)$ ⇨ $= (-2i).(-2i)$ ⇨ $= 4i^2$ ⇨ $= -4+i0$	**1** **1**
Question23.	Solve the inequality $\frac{3(x-2)}{5} \leq \frac{5(2-x)}{3}$.	
Solution:	We have $\frac{3(x-2)}{5} \leq \frac{5(2-x)}{3}$ ⇨ $9(x - 2) \leq 25(2 - x)$ ⇨ $9x - 18 \leq 50 - 25x$ ⇨ $9x + 25x \leq 18 + 50$ ⇨ $34x \leq 68$ ⇨ $x \leq 2$ ⇨ $x \in [2, \propto)$	**1** **1**
Question24.	Find the 10th term of a G.P. whose 3rd term is 24 and 6th term is 192.	
Solution:	We have, $a_3 = ar^2 = 24$ …(1) ⇨ $a_6 = ar^5 = 192$ …(2) Dividing (2) by (1), we have ⇨ $r^3 = 8$ ⇨ $r = 2$ ⇨ $a(2)^2 = 24$ ⇨ $a = 6$ $\therefore a_{10} = a.r^9 = 6.(2)^9$ $a_{12} = 6.(512) = 3072$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
Question25.	Find the equation of the parabola with vertex at (0,0) and focus at (0, 2).	
Solution:	Since the vertex is at (0,0) and the focus is at (0, 2) which lies on y-axis. ⇨ Y-axis is the axis of the parabola.	

	⇨ Equation of the parabola is of the form $x^2 = 4ay$ ⇨ $a = 2$ ⇨ $x^2 = 4(2)y$ ⇨ $x^2 = 8y$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
OR Question25.	Find the equation of the ellipse, whose vertices are $(0, \pm 13)$ and foci are $(0, \pm 5)$.	
Solution:	Since the vertices are on y-axis, the major axis is along the y-axis. So equation of ellipse is of the form $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$ Given that a = semi major axis = 13, and $c = \pm 5$ from foci $(0, \pm 5)$ And the relation $c^2 = a^2 - b^2$, gives $5^2 = 13^2 - b^2$ i.e. $b^2 = 144$ Therefore, the equation of the ellipse is $\frac{x^2}{25} + \frac{y^2}{144} = 1$	1 1
	SECTION – C (3Marks × 6Q)	
Question26.	If U ={1,2,3,4,5,6,7,8,9}, A = {2,4,6,8} and B = {2,3,5,7}.Verify that $(A \cup B)' = A' \cap B'$.	
Solution:	Here $A \cup B$ = {2,3,4,5,6,7,8} ∴ $(A \cup B)'$ = {1,9} Now A' = {1,3,5,7,9} and B' = {1,4,6,8,9} ∴ $A' \cap B'$ = {1,9} ⇨ $(A \cup B)' = A' \cap B'$	$\frac{1}{2}$ 1 1 $\frac{1}{2}$
Question27.	Find the domain and Range of the function $\sqrt{4 - x^2}$.	
Solution:	Here $y = \sqrt{4 - x^2}$ y will have real values if $4 - x^2 \geq 0$ $\Rightarrow x^2 - 4 \leq 0$ $\Rightarrow (x-2)(x+2) \leq 0$ $\Rightarrow -2 \leq x \leq 2 \Rightarrow x \in [-2, 2]$ Domain = [-2, 2] Also, $y^2 = 4 - x^2$ $\Rightarrow x^2 = 4 - y^2$ $\Rightarrow x = \pm\sqrt{4 - y^2}$ Clearly x is defined when $4 - y^2 \geq 0$ i.e., when $y^2 - 4 \leq 0$ $\Rightarrow (y-2)(y+2) \leq 0$ $\Rightarrow -2 \leq y \leq 2 \Rightarrow y \in [-2, 2]$	$1\frac{1}{2}$

	But $y = \sqrt{4 - x^2} \geq 0$ for all $x \in [-2, 2]$ i.e., y attains only non-negative values. $\therefore y \in [0, 2]$ for all $x \in [-2, 2]$ $\therefore$ Range = [0, 2].	$1\frac{1}{2}$
Question28.	Expand: $\left(x^2 + \frac{3}{x}\right)^4$; $x \neq 0$	
Solution:	$\left(x^2 + \frac{3}{x}\right)^4 = {}^4C_0\,(x^2)^4\left(\frac{3}{x}\right)^0 + {}^4C_1\,(x^2)^3\left(\frac{3}{x}\right)^1 + {}^4C_2\,(x^2)^2\left(\frac{3}{x}\right)^2 + {}^4C_3$ $(x^2)^1\left(\frac{3}{x}\right)^3 + {}^4C_4\,(x^2)^0\left(\frac{3}{x}\right)^4$ $= x^8 + 4.(x^6)\left(\frac{3}{x}\right) + 6.(x^4)\left(\frac{9}{x^2}\right) + 4.(x^2)\left(\frac{27}{x^3}\right) + 1.(1)\left(\frac{81}{x^4}\right)$ $= x^8 + 12x^5 + 54\,x^2 + \frac{108}{x} + \frac{81}{x^4}$	$1\frac{1}{2}$ $1\frac{1}{2}$
OR Question28.	Which is larger $(1.01)^{1000000}$ or 10,000?	
Solution:	$(1.01)^{1000000} = (1+ .01)^{1000000}$ $= {}^{1000000}C_0\,(1)^{1000000}(.01)^0 + {}^{1000000}C_1\,(.01)^1$ + other positive terms $= 1 + 100000 \times .01$ + other positive terms = 1 + 10000 + other positive terms = 10001 + other positive terms >10000 Hence $(1.01)^{1000000} > 10000$	$\frac{1}{2}$ $1\frac{1}{2}$ 1
Question29.	Find the sum of the sequence 8, 88, 888, 8888, …….. to n terms.	
Solution:	This is not a GP., however, we can relate it to a GP. by writing the terms as $S_n = 8 + 88 + 888 + 8888 + ...$ to n terms $= \frac{8}{9}$ [9 + 99 + 999 + 9999 +... to n term] $= \frac{8}{9}$ [$(10^1 - 1) + (10^2 - 1) + (10^3 - 1) + (10^4 - 1)$ +...n terms] $= \frac{8}{9}$ [$(10+10^2+10^3+$...n terms) - (1+1+1+...n terms)] It is a G.P. where a = 10 and r = 10 > 1 $\therefore\ S_n = \frac{a(r^n - 1)}{r - 1}$ $= \frac{8}{9}\left[\frac{10(10^n - 1)}{10 - 1} - n\right] = \frac{8}{9}\left[\frac{10(10^n - 1)}{9} - n\right]$	1 1 1
OR Question 29	If A.M. and G.M. of two positive number a and b are 10 and 8 respectively, find the numbers.	
Solution:	Given that A.M. = $\frac{a+b}{2} = 10$ and G.M. = $\sqrt{a.b} = 8$ ⇨ a + b = 20 …(1) and ab = 64 …(2) Using the identity, $(a - b)^2 = (a + b)^2 - 4ab$ and putting the respective values, we have $(a - b)^2 = (20)^2 - 4(64)$	$\frac{1}{2}$

	$a - b = \sqrt{400 - 256}$ $a - b = \pm 12$ …(3) Solving (1) and (3), we obtain a = 4 and b = 16 or a = 16 and b = 4 thus the number are 4, 16 or 16, 4 respectively	1 $1\frac{1}{2}$
Question30.	Find the equation of the set of the points P such that $PA^2 + PB^2 = 2k^2$, where A and B are the points (3, 4, 5) and (-1, 3, -7), respectively.	
Solution:	Let the coordinate of the point P be (x, y, z) . ∴ $PA = \sqrt{(x-3)^2 + (y-4)^2 + (z-5)^2}$ ⇨ $PA^2 = (x-3)^2 + (y-4)^2 + (z-5)^2$ Now $PB = \sqrt{(x+1)^2 + (y-3)^2 + (z+7)^2}$ ⇨ $PB^2 = (x+1)^2 + (y-3)^2 + (z+7)^2$ By the given condition $PA^2 + PB^2 = 2k^2$, we have $(x-3)^2 + (y-4)^2 + (z-5)^2 + (x-3)^2 + (y-4)^2 + (z-5)^2 = 2k^2$ $2x^2 + 2y^2 + 2z^2 - 4x - 14y + 4z = 2k^2 - 109$	 $1\frac{1}{2}$ $1\frac{1}{2}$
Question31.	In how many ways can a student choose a programme of 5 courses if 9 courses are available and 2 specific courses are compulsory for every student?	
Solution:	There are 9 courses available and 5 courses are to be chosen out of 9. Since 2 courses are compulsory for every student. Therefore, now we have to choose 3 courses out of remaining7 courses. This can be done in ${}^7C_3$ ways ∴ ${}^7C_3 = \frac{7!}{(7-3)!.3!}$ $= \frac{7.6.5.4}{4.3.2.1.} = 35$ ways	 $1\frac{1}{2}$ $1\frac{1}{2}$
	SECTION – D (5Marks × 4Q)	
Question32.	(i) Prove that: $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$ (ii) Prove that: $\cot^2 \frac{\pi}{6} + \text{cosec} \frac{5\pi}{6} + 3\tan^2 \frac{\pi}{6} = 6$	
Solution: (i)	$\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$ L.H.S. $= \frac{\sin 5x + \sin x - 2\sin 3x}{\cos 5x - \cos x}$ [rearranging]	

	Using $\cos C - \cos D = 2\sin\left(\frac{C+D}{2}\right).\sin\left(\frac{C-D}{2}\right)$ and $\sin C + \sin D = 2\sin\left(\frac{C+D}{2}\right).\cos\left(\frac{C-D}{2}\right)$, we have ⇨ $= \frac{2\sin 3x\,.\,\cos 2x - 2\sin 3x}{-2\sin 3x\,.\sin 2x}$ ⇨ $= \frac{2\sin 3x\,.\,(\cos 2x - 1)}{-2\sin 3x\,.\sin 2x}$ ⇨ $= \frac{1-\cos 2x}{\sin 2x}$ ⇨ $= \frac{2\sin^2 x}{2.\sin x\,.\cos x}$ ⇨ = tan x ⇨ L.H.S. = R. H.S.	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1
Solution:(ii)	L.H.S. = $\cot^2\frac{\pi}{6} + \mathrm{cosec}\,\frac{5\pi}{6} + 3\tan^2\frac{\pi}{6}$ => $= (\cot\frac{\pi}{6})^2 + \mathrm{cosec}\,(\pi - \frac{\pi}{6}) + 3\,(\tan\frac{\pi}{6})^2$ We have, $= (\sqrt{3})^2 + \mathrm{cosec}\,\frac{\pi}{6} + 3\,(\frac{1}{\sqrt{3}})^2$ $= 3 + 2 + 3.\frac{1}{3}$ $= 3+2+1 = 6$ ⇨ L.H.S. = R. H.S.	1 1
Question33.	Find the coordinates of the foot of perpendicular from the point (-1, 3) to the line 3x – 4y – 16 = 0.	
Solution:	Given equation of line 3x – 4y – 16 =0 …(1) Let the foot of perpendicular be (x, y) from (-1, 3). Since line joining (x, y) and (-1, 3) and the given line 3x – 4y – 16 =0 are perpendicular with each other ∴ Equation of any line perpendicular to 3x – 4y – 16 = 0 is 4x + 3y + k = 0 …(2) Now line (2) is passing through (-1, 3) ⇨ 4(-1) + 3(3) + k = 0 ⇨ k = -5 ∴ Equation of line passing through (-1, 3) and ⊥ar to 3x – 4y – 16 = 0 is 4x + 3y – 5 = 0 …(3) Now solving equations (1) and (3)(any method), we obtain 3x – 4y = 16 …(4) 4x + 3y = 5 …(5) Multiply (4) by 3, (5) by 4 and then adding , we have	1 $1\frac{1}{2}$

	25x = 68 => x = $\frac{68}{25}$ using this value in (5), we have 4($\frac{68}{25}$) + 3y = 5 => 3y = 5 - $\frac{272}{25}$ 3y = $\frac{125-272}{25}$ => 3y = $\frac{-147}{25}$ y = $\frac{-49}{25}$ So foot of perpendicular is ($\frac{68}{25}$, $\frac{-49}{25}$)	$2\frac{1}{2}$
OR Question33.	Find the equation of the lines through the point (3, 2) which make an angle of 45° with the line x – 2y = 3.	
Solution:	Given equation of line x – 2y = 3 and θ = 45° ∴ Slope of line = $\frac{-\text{coeff.of x}}{\text{coeff.of y}} = \frac{-1}{-2} = \frac{1}{2}$ $m_1 = \frac{1}{2}$ Let m be the slope of required line. Now $\tan\theta = \left\|\frac{m_1 - m_2}{1+ m_1.m_2}\right\|$ ⇨ $\tan 45° = \left\|\frac{m_1 - \frac{1}{2}}{1+ m_1.(\frac{1}{2})}\right\|$ ⇨ $1 = \left\|\frac{m_1 - \frac{1}{2}}{1+ \frac{m_1}{2}}\right\|$ ⇨ $\pm 1 = \frac{m_1 - \frac{1}{2}}{1+ \frac{m_1}{2}}$ ⇨ $1 + \frac{m_1}{2} = m_1 - \frac{1}{2}$ or $-1 - \frac{m_1}{2} = m_1 - \frac{1}{2}$ ⇨ $\frac{-m_1}{2} = \frac{-3}{2}$ or $\frac{3m_1}{2} = \frac{-1}{2}$ ⇨ $m_1 = 3$ or $m_1 = \frac{-1}{3}$ ∴ Equations of lines through (3, 2) having slopes 3 and -1are y – 2 = 3(x – 3) => 3x - y = 7 and y – 2 = $\frac{-1}{3}$ (x -3) => x + 3y = 9	$\frac{1}{2}$ $\frac{1}{2}$ 2 2
Question34.	Find the derivative of cos x from first principle.	
Solution:	Let f(x) = cos x , the $\frac{d(f(x))}{dx} = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \to 0} \frac{\cos(x+h) - \cos(x)}{h}$ $= \lim_{h \to 0} \left[\frac{-2\sin(\frac{x+h+x}{2})\sin(\frac{x+h-x}{2})}{h}\right]$ [using cos C – cos D = -2 sin ($\frac{C+D}{2}$).sin ($\frac{C-D}{2}$)] $= -\lim_{h \to 0} \left[\frac{\sin(\frac{2x+h}{2})\sin(\frac{h}{2})}{\frac{h}{2}}\right]$	1 2

	$= -\lim_{h\to0}\left[\sin(\frac{2x+h}{2})\right].\lim_{h\to0}\left[\frac{\sin(\frac{h}{2})}{\frac{h}{2}}\right]$ = - sin x . (1) = - sin x	**2**
OR Question34.	Suppose $f(x) = \begin{cases} mx^2 + n, & x < 0 \\ nx + m, & 0 \le x \le 1 \\ nx^3 + m, & x > 1 \end{cases}$. For what value of m and n does both $\lim_{x\to0} f(x)$ and $\lim_{x\to1} f(x)$ exists?	
Solution:	Here, limit exist at $x \to 0$ i.e., LHL = RHL ...(1) LHL at $x \to 0$ $= \lim_{x\to0-} f(x)$ $= \lim_{h\to0} f(0-h)$ $= \lim_{h\to0}[m(-h)^2 + n]$ $= n$ ...(2) RHL at $x\to 0$ $= \lim_{x\to0+} f(x)$ $= \lim_{h\to0} f(0+h)$ $= \lim_{h\to0}[n(0+h) + m]$ $= m$ …(3) From (1), (2) and (3) n = m Here, limit exist at $x \to 1$ i.e., LHL = RHL ...(1) LHL at $x \to 1$ $= \lim_{x\to1-} f(x)$ $= \lim_{h\to0} f(1-h)$ $= \lim_{h\to0}[n(1-h) + m]$ $= n + m$ ...(2) RHL at $x\to 1$ $= \lim_{x\to1+} f(x)$ $= \lim_{h\to0} f(1+h)$ $= \lim_{h\to0}[n(1+h)^3 + m]$ $= n + m$ …(3) For $\lim_{x\to0} f(x)$ to exists, we need n = m For $\lim_{x\to1} f(x)$ exists for any integral value of m and n.	$1\frac{1}{2}$ $1\frac{1}{2}$ 1 1

Question35.	Calculate mean, variance and standard deviation for the following distribution. Classes: 0- 10, 10-20, 20-30, 30-40, 40-50 Frequency: 5, 8, 15, 16, 6	

Classes	0- 10	10-20	20-30	30-40	40-50
Frequency	5	8	15	16	6

Solution:

From the given data, we construct the following table.

Class	Frequency f_i	Midpoint x_i	$f_i x_i$	$(x_i - \bar{x})^2$	$f_i(x_i - \bar{x})^2$
0 – 10	5	5	25	484	2420
10 – 20	8	15	120	144	1152
20 – 30	15	25	375	4	60
30 – 40	16	35	560	64	1024
40 – 50	6	45	270	324	1944
	50		1350		6600

Thus Mean $\bar{x} = \frac{1}{N} \sum_{i=1}^{i=7} f_i x_i$

$= \frac{1350}{50} = 27$ $3\frac{1}{2}$

Variance (σ^2) $= \frac{1}{N} \sum_{i=1}^{i=7} f_i \,(x_i - \bar{x})^2$

$= \frac{6600}{50} = 132$ 1

and Standard deviation(σ) = $\sqrt{132}$ = 11.49 $\frac{1}{2}$

SECTION – E (4Marks × 3Q)

Question36. The sum or difference of trigonometric functions can be transformed into a product of trigonometric functions by using the following formulae:

(a) $\sin C + \sin D = 2 \sin \frac{C+D}{2} \cos \frac{C-D}{2}$

(b) $\sin C - \sin D = 2 \cos \frac{C+D}{2} \sin \frac{C-D}{2}$

(c) $\cos C + \cos D = 2 \cos \frac{C+D}{2} \cos \frac{C-D}{2}$

	(d) $\sin C + \sin D = 2\sin\frac{C+D}{2}\sin\frac{D-C}{2}$ *Based on the above information, answer the following questions.* (i) The value of $\sin 80° - \sin 20°$ is: (a) cos 30° (b) cos 60° (c) sin 30° (d) cos 50° (1) (ii) The value of cos 15° - sin 15° is: (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{2}$ (d) $\frac{-1}{\sqrt{2}}$ (1) (iii) sin 70° + sin 80° is equal to: (a) 2 cos15°.cos 5°(b) 2 sin15°.sin 5°(c) 2 cos15°.sin 5°(d) None of these (1) (iv) sin 51° + cos 81° - cos 21° is equal to: (a) 1 (b) 0 (c) -1 (d) 2 (1)	
Solution:	(i) (d) cos 50°	**1**
	(ii) (a) $\frac{1}{\sqrt{2}}$	**1**
	(iii) (a) 2 cos15°.cos 5°	**1**
	(iv) (b) 0	**1**
Question37.	In a class of 60 students, 30 opted for NCC, 32 opted for NSS and 24 opted for both NCC and NSS. One of the students is selected at random from the class. *Based on the above information answer the following questions:* (i) The probability that the student has opted for only NCC is: (a) $\frac{1}{2}$ (b) $\frac{1}{10}$ (c) $\frac{19}{30}$ (d) $\frac{11}{30}$ (ii) The probability that the student has opted for both NCC and NSS is: (a) $\frac{1}{2}$ (b) $\frac{2}{5}$ (c) $\frac{19}{30}$ (d) $\frac{11}{30}$ (iii)The probability that the student has opted for NCC or NSS is: (a) $\frac{1}{2}$ (b) $\frac{2}{5}$ (c) $\frac{19}{30}$ (d) $\frac{2}{15}$ (iv) The probability that the student has opted neither both NCC nor NSS is: (a) $\frac{1}{2}$ (b) $\frac{2}{5}$ (c) $\frac{11}{30}$ (d) $\frac{2}{15}$	
Solution:	(i) (b) $\frac{1}{10}$ (ii) (b) $\frac{2}{5}$ (iii) (c) $\frac{19}{30}$ (iv) (c) $\frac{11}{30}$	**1** **1** **1** **1**

Question 38.	Indian track and field athlete Neeraj Chopra, who completes in the javelin throw, won a gold medal at Tokyo Olympics. He is the first track and field athlete to win a gold medal for India at the Olympics. *Based on above information, answer the following:* (i) Name the shape of paths followed by javelin. (1) (ii) If the equation of such curve is given by $x^2 = -16y$, then write coordinate of foci. (1) (iii) Write the equation of directrix and length of semi- latus rectum. (2)	
Solution: (i)	Shape of path is Parabola.	**1**
(ii)	Comparing $x^2 = -16y$ with standard form $x^2 = -4ay$ we have ⇨ $-4a = -16$ ⇨ $a = 4$ ∴ **Focus:** $(0,-a) = (0,-4)$	**1**
(iii)	**Equatio of Directrix**: $y = a$ ⇨ $y = 4$ **Length of latus rectum**: $4a = 4\times4 = 16$	**2**