



INDIAN SCHOOL MUSCAT
FINAL TERM 2 EXAMINATION
APPLIED MATHEMATICS (241)



CLASS: XI
MAX.MARKS: 40

Marking Scheme

SECTION A		
1	$P(3B) = \frac{C_3^5}{C_3^{20}} = \frac{1}{114}$	1+1
2	$3x + 2y - 12 = 0 \Rightarrow y = \frac{-3}{2}x + 6$ $\Rightarrow m_1 = -3/2 \Rightarrow m_2 = 2/3$ $\Rightarrow y - 4 = 2/3(x + 3)$ $\Rightarrow 3y - 2x - 18 = 0$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
3	$A = \{2, 3, 5\}$ $B = \{1, 3, 5\}$ $B-A = \{1\}$ $P(B) = 1/6$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
4	$CGST = 9\% \text{ of } 8400 = ₹756$	1+1
5	$S.I. = ₹240$ $\text{Amount} = ₹1440$	1 1
6	(i) $2r + r + 5 = 11$ $\Rightarrow r = 2$ $\therefore C_r^7 = C_2^7 = \frac{7 \times 6}{1 \times 2} = 21$	$\frac{1}{2}$ $\frac{1}{2}$ 1
	OR	
	(ii) Committee of exactly 3 girls = $C_3^4 \times C_2^5$ $= C_1^4 \times C_2^5$ $= \frac{4 \times 5 \times 4}{1 \times 2} = 40$	1 1
SECTION B		
7	$\lim_{x \rightarrow 1} \frac{x^2 - 1}{2x^2 - 7x + 5} = \lim_{x \rightarrow 1} \frac{(x+1)(x-1)}{(x-1)(2x-5)}$ $= \lim_{x \rightarrow 1} \frac{(x+1)}{(2x-5)} = \frac{-2}{3}$	1+1 1

8	<p>Classification on the basis of time of payment</p> <p>(i) Regular annuity or ordinary annuity.</p> <p>(ii) Annuity due.</p> <p>(iii) Deferred annuity.</p>	1 1 1
9	<p>(i) $x^2 + y^2 - 8x + 10y - 12 = 0$.</p> $\Rightarrow g = -4, f = 5$ $\Rightarrow \text{centre} = (4, -5)$ $\Rightarrow r = \sqrt{53}$ <p style="text-align: center;">OR</p> <p>(ii) $y^2 = -8x \Rightarrow a = -2$</p> <p>Focus = (-2, 0)</p> <p>Directrix $\Rightarrow x = 2$</p> <p>Equation of axis $\Rightarrow y = 0$</p> <p>LR = 8</p>	1 1 1 1
10	<p>(i) $Y = (x^3 + 3x)^2$</p> $\frac{dy}{dx} = 2(x^3 + 3x)(3x^2 + 3) = (x^3 + 3x)(6x^2 + 6)$ <p style="text-align: center;">OR</p> <p>(ii) LHL = 7</p> <p>RHL = 2k</p> <p>Since $f(x)$ is cont at $x = 5 \Rightarrow 2k = 7$</p> $\Rightarrow k = 7/2$	2+1 1 1 $\frac{1}{2}$ $\frac{1}{2}$
	SECTION C	
11	<p>Given $R = ₹ 800, i = 0.08$ and $n = 3$</p> $A = R \left[\frac{(1+i)^n - 1}{i} \right]$ $\Rightarrow A = \frac{800}{0.08} [(1.08)^3 - 1]$ $= 10000[1.26 - 1]$ $= 2600$ <p style="text-align: center;">OR</p> <p>(ii) Gross income = $975000 + 80000 = ₹1055000$</p> <p>Income tax = $75000 + 20\% \text{ of } 55000$</p> $= 86000 ₹$ <p>Cess = $4\% \text{ of } 86000 = ₹3440$</p> <p>Total Tax Liability = $₹ (86000 + 3440) = ₹ 89440$</p>	1 $\frac{1}{2}$ 2 $\frac{1}{2}$ 1 1 1 1

12	M -> 2, A -> 2, T -> 2, Vowels -> A,A,E,I, Total -> 11 (i) $\frac{9!}{2!2!} = 90720$ (ii) $\frac{8!}{2!2!} \times \frac{4!}{2!} = 120960$	2 2
13	$I = P [(1 + i)^n - 1]$ $\Rightarrow 5712 = P [(1.04)^2 - 1]$ $\Rightarrow 5712 = P \times 0.0816$ $\Rightarrow P = \frac{5712}{0.0816} = ₹70000$	$\frac{1}{2}$ 1 $1\frac{1}{2}$ 1
CASE BASED QUESTION		
14.	<p>Let E be the event that the doctor visit the patient late and let A_1, A_2, A_3, A_4 be the events that the doctor comes by cab, metro, bike and other means of transport respectively.</p> <p>$P(A_1) = 0.3, P(A_2) = 0.2, P(A_3) = 0.1, P(A_4) = 0.4$</p> <p>$P(E A_1) = 0.25$</p> <p>$P(E A_2) = 0.3, P(E A_3) = 0.35$</p> <p>and $P(E A_4) = 0.1$</p> <p>(i) Probability that the doctor is late by any means $= \frac{2}{7} + \frac{5}{14} + \frac{1}{6} + \frac{4}{21} = 1$</p> <p>(ii) $P(A_2 E) = \frac{P(A_2)P(E A_2)}{\sum P(A_i)P(E A_i)}$ $= \frac{(0.2)(0.3)}{(0.3)(0.25) + (0.2)(0.3) + (0.1)(0.35) + (0.4)(0.1)}$ $= \frac{0.06}{0.21} = \frac{2}{7}$</p>	2 2