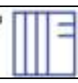
ROLL NUMBER				

SET	A,B

INDIAN SCHOOL MUSCAT
APPLIED MATHEMATICS (241)

CLASS : XI

SECTION A

SET A		SET B	
1	(C) = 0.28	1	(c) {8, 27}
2	(b) 14 : 11	2	(b) 11001000
3	(d) {8, 27}	3	(a) log 5 + log 81
4	(d) $\emptyset \subset \{\{0\}, 1,2\}$	4	(a) &?#
5	(b) 1100100	5	(c) Monday
6	(d) $\frac{8}{27}$	6	(d) $\frac{7}{13}$
7	(a) log 5 + log 81	7	(d) $\emptyset \subset \{\{0\}, 1,2\}$
8	(b) Sunday	8	(a) $\frac{1}{3}$
9	(c) 100°	9	(C) = 0.28
10	(a) &?#	10	(c) Input Tax Credit
11	(d) Granddaughter	11	(d) ₹ 105
12	c 	12	(b) $\frac{8}{27}$
13	(b) 2^5	13	a 
14	(a) $\frac{1}{3}$	14	(b) 10°
15	(d) ₹ 105	15	(b) 14 : 11
16	(c) Input Tax Credit	16	(b) 2^5
17	(d) $\frac{7}{13}$	17	(d) Granddaughter
18	(b) B – $(A \cup C)$	18	(a) B – $(A \cup C)$
19	(a)	19	(d)
20	(b)	20	(b)

SECTION B

21. (a)	Explanation: If we arrange the English alphabets in reverse order then the positions of P, A and C are 11, 26 and 24 respectively. When we add these numbers we get 61. Similarly, when we add the reverse position numbers of the letters of the word PEN we get, 13+22+11 i.e. 46.	(b) GANGA is coded as 73673.

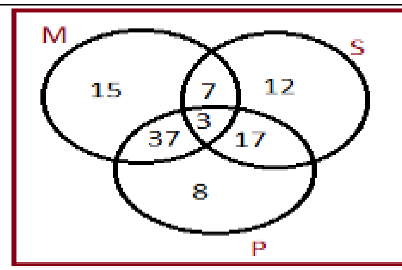
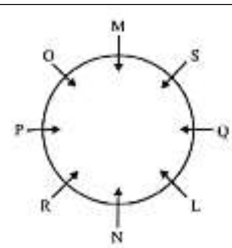
22.	Both the conclusions are correct.	**SET B –First conclusion is correct but second one is wrong.**
23.	{DDD, DDN, DND, NDD, DNN, NDN, NND, NNN} **Set B – S = {RB, BR, RR, BB}**	
24.	Any two	
25.(a)	Let P = x A = 2x So I = x t = 25	(b) $A = P(1+i)^n$ $= 1000 \times (1+5\%)^5$ $= 1000 \times (1+0.05)^5$ $= 1000 \times (1.05)^5$ $= 1000 \times 1.276$ $= ₹\ 1276$

SECTION C

26. (a)	Number of boys = 9, number of girls = 4 Total members in a committee = 7 (i) Number of ways forming a committee having at least 3 girls = ${}^4C_3 \times {}^9C_4 + {}^4C_4 \times {}^9C_3$ = 504 + 84 = 588 (ii) Number of ways forming a committee having at most 3 girls = ${}^4C_3 \times {}^9C_4 + {}^4C_2 \times {}^9C_5 + {}^4C_1 \times {}^9C_6 + {}^4C_0 \times {}^9C_7$ = 504 + 756 + 336 + 36 = 1632 OR	(b)	$\frac{(n-1)!}{(n-4)!} \div \frac{(n+1)!}{(n-2)!} = \frac{5}{12}$ $7n^2 - 65n + 72 = 0$ n = 8 or 9/7 => n = 8 [set b – n = 5 set c – n = 6]
	SET B: **a) (i) $^5P_3$ = 5 x 4x3 = 60** **(ii) 5^3 = 125**	**b)**	$\frac{n!}{2(n-4)!} \div \frac{4!(n-4)!}{n!} = \frac{1}{6}$ **$n^2 - 5n - 66 = 0$** **n = 11, -6** **∴ n = 11**
27.	(a) 4 **SET B : Q. No. 31 (a) 1/4**	(b)	X = $\pm$13, but x cannot be -, so x = 13
28.	(i) IGST = 0 (ii) CGST = ₹756 (iii) SGST = ₹ 756		
29.	r = 0.21 per year n = 12 months per year Effective annual interest rate = [1 + (.21 / 12)] ^{12} - 1	SET –B -Q.No. 27	

	$= [1 + 0.0175]^{12} - 1$ $= (1.0175)^{12} - 1$ $= 1.2314 - 1$ $= 0.2314$ $= 23.14\%$	$i_a = [1 + (0.12/4)]^4 - 1$ $= (1.03)^4 - 1$ $= 1.1255 - 1$ $= .1255$ $= 12.55\%$	
30.	(i) required probability = 4/9 (ii) required probability = 6/9 = 2/3 (iii) required probability = 7/9	**Set B:**	**(i) required probability = 3/9= 1/3** **(ii) required probability = 5/9** **(iii) required probability = 7/9**
31.	(a) Consider the following events: Ei = Seed chosen is of type Ai , i = 1, 2, 3 ;A = Seed chosen germinates. We have, P(E1) = 4 /10 , P(E2) = 4 /10 and P(E3) = 2 /10 P(A/E1) = 45 /100 , P(A/E2) = 60 /100 , P(A/E3) = 35 /100 (i) Required probability = P(A) = P(E1) P(A/E1) + P(E2) P(A/E2) + P(E3) P(A/E3) = 0.49 **OR** (b) S = {G1G2, G1B2, B1G2, B1B2} Let A be the event that both children are girls, B be the event that the youngest child is a girl and C be the event that at least one of the children is a girl. Then A = {G1G2}, B = {G1G2, B1G2} and C = {B1G2, G1G2, G1B2} ⇒ A∩B = {G1G2} and A∩C = {G1G2} (i) Required probability = P(A/B) = 1/ 2 (ii) Required probability = P(A/C) = 1/ 3		

SECTION D

32.	Venn Diagram -------------- 1 X = 3 ------------------------- 1 (i) 62 ------------------------- 1 (ii) 39 ------------------------ 1 (iii) 1 -----------------------1		
33.	(a) (i) M (ii) S (iii) R (iv) O		(b) Taking log on both sides ----- 1 mark Log x = ½ (1.6321) + 1.9289----2 mark = 0.81605 + 1.9289 ------1/2 = 2.74495 ≈ 2.745 ------1/2 / or 2.7449 X = antilog 2.745 x = antilog 2.7449 = 555.9 ---------1 x = 555.8
	SET B: (b) **log x = ½ [log 31.67 + log 42.36 – log 9.25]** **= ½ [1. 5007 + 1. 6269 – 0. 9661]** **= ½ [2.1615]** **= 1.08075** **X = antilog 1.0808 = 12.04**		
34	(a) Fixed charge = ₹200------------1 Surcharge = ₹ 234.80-------------1 Energy Charge = ₹ 2715.50------1 Energy Tax = ₹145.80 -------------1	(b) Total Salary = ₹ 10,22,400 Annual Bonus = ₹60,000 Gross Income = ₹ 10,82,400 -----------1 Income Tax = ₹91,480 ---------1 1/2	

	Bill = ₹ 3296.10 ------------1	Cess = ₹3659 -----------1/2 (or ₹3659.2) Tax liability = ₹ 95,139 ----------1 Tax paid in 11 months = ₹82500-----1/2 Tax to be paid in the last month = ₹12,639----1/2

35

The amount (FV) of an ordinary annuity is given by

$$FV = \frac{C}{i}\left[(1+i)^n - 1\right]$$

$C = ₹\ 500,$

$$i = \frac{8}{100 \times 4} = \frac{0.08}{4} = 0.02,$$

$n = 10 \times 4 = 40$

$$\therefore\ FV = \frac{500}{0.02}\left[(1+0.02)^{40} - 1\right]$$

$$\Rightarrow FV = \frac{500}{0.02}\left[(1.02)^{40} - 1\right]$$

$$\Rightarrow FV = \frac{500}{0.02}\ [2.2080 - 1]$$

$$\Rightarrow FV = \frac{500 \times 1.2080}{0.02} = 30,200$$

SECTION E

36.

(i) Total members = 6

$\because$ Room A is double share room.

$\therefore$ The number of ways in which room A can be filled

$$= \binom{6}{2} = \frac{6!}{2! \times 4!} = 15$$

(ii) Now, rooms A and B can be filled with 2 members each and room C can be filled with 1 person.

$\therefore$ Required number of ways = ${}^{2}C_1 = 2$

(iii) Required number of ways = $\binom{6}{2} \cdot \binom{4}{2}\binom{2}{1}\binom{1}{1}$

$= 15 \times 6 \times 2 \times 1 = 180$

OR

(iii) As, room A is filled with 2 persons

Now, the remaining persons = 4

Given that room C and D can occupy 1 person each.

$\therefore$ The number of ways in which rooms C and D can be filled = ${}^4C_1 \times {}^3C_1 = 12$

37.	(i) Since each row is increasing by 10 seats, so it is an AP with first term a= 30, and common difference d=10. So number of seats in 10^{th} row = a_{10} = a+ 9d = 30 + 9×10 = 120 (ii) If no. of rows =17 then the middle row is the 9^{th} row ½ a_9 = a+ 8d = 30 + 80 = 110 seats ½ (iii) $S_n = \frac{n}{2}(2a + (n-1)d)$ $1500 = \frac{n}{2}(2 \times 30 + (n-1)10)$ ½ $3000 = 50n + 10n^2$ $n^2 + 5n - 300 = 0$ ½ $n^2 + 20n - 15n - 300 = 0$ $(n+20)(n-15) = 0$ ½ Rejecting the negative value, n= 15 ½ **OR** No. of seats already put up to the 10^{th} row = S_{10} ½ $S_{10} = \frac{10}{2}\{2 \times 30 + (10-1)10\}$ ½ = 5(60 + 90) = 750 ½ No. of seats left to be put = 1500 – 750= 750. ½	½ ½
38.	Solution: Let E_1 = The policy holder is accident prone. E_2 = The policy holder is not accident prone. E = The new policy holder has an accident within a year of purchasing a policy. (i) $P(E) = P(E_1) \times P(E/E_1) + P(E_2) \times P(E/E_2)$ $= \frac{20}{100} \times \frac{6}{10} + \frac{80}{100} \times \frac{2}{10} = \frac{7}{25}$ (ii) By Bayes' Theorem, $P(E_1/E) = \frac{P(E_1) \times P(E/E_1)}{P(E)}$ $= \frac{\frac{20}{100} \times \frac{6}{10}}{\frac{280}{1000}} = \frac{3}{7}$ (i) P(E) = 7/25 or 0.28	