

SEM	SET	PAPER CODE	TITLE OF THE PAPER
II	2014	14PCA2113	PROBABILITY AND STATISTICS

SECTION – B**Answer all the questions:****5 x 5 = 25**

31. a. From 25 tickets, marked with the first 25 numerals, one is drawn at random. Find the chance that (i) it is a multiple of 5 or 7 (ii) it is a multiple of 3 or of 7.

OR

- b. Two dice are thrown. Let A be the event that the sum of the points on the faces shown is odd and let B be the event of at least one '1'. Describe the complete sample space and the events A, B, $A \cap B$ and $A \cup B$. find their probabilities assuming all the 36 sample points have equal probabilities.
32. a. A random variable X has the following probability distribution:

Values X, x	0	1	2	3	4	5	6	7	8
P(x)	a	4a	9a	16a	25a	36a	49a	64a	81a

- (i) Determine the value of a
(ii) Find $P(X < 3)$, $P(X \geq 3)$, $P(0 < X < 5)$

OR

- b. A continuous random variable X has a p.d.f. $f(x) = 6x(1-x)$, $0 \leq x \leq 1$. Determine a number b such that $P(X < b) = P(X > b)$.

33. a. Ten coins are thrown simultaneously. Find the probability of getting at least seven heads.

OR

- b. X is normally distributed. The mean of X is 12 and S.D. is 4. Find (i) $P(X \geq 20)$ (ii) $P(X \leq 20)$ and (iii) $P(0 \leq X \leq 12)$.
34. a. Write five applications of Chi-square distribution.

OR

- b. The mean weekly sales of soap bars in departmental stores was 146.3 bars per store. After an advertising campaign the mean weekly sales in 22 stores for a typical week increased to 153.7 and showed a standard deviation of 17.2 was the advertising campaign successful.
35. a. Calculate the minimum number of replications so that an observed differences of 10% of the mean will be taken as significant at 5% level, the C.V. of the plot values being 12%.

OR

- b. Write the advantages of Latin Square design.

SECTION – C

Answer any THREE questions:

3 x 15 = 45

36. In a bolt factory, machines A, B and C manufacture respectively 25%, 35% and 40% of the total. Of their output 5, 4, 2 percents are defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by machines A, B and C?
37. For geometric distribution $p(x) = 2^{-x}$, $x=1, 2, \dots$, prove that Chebyshev's inequality gives $P\{|X - 2| \leq 2\} > 1/2$ while the actual probability is 15/16.

38. Ten students obtained the following percentage of marks in the college internal test (x) and in the final university examination (y). find the correlation coefficient between the marks of the two tests.

X	51	63	63	49	50	60	65	63	46	50
Y	49	72	75	50	48	60	70	48	60	56

39. A random sample of 10 boys had the following I.Q's 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these data support the assumption of a population mean I.Q of 100? Find a reasonable range in which most of the mean I.Q. values of samples of 10 boys lie.
40. The following table shows the lives in hours of four batches of electric lamps:

Batches:

1.	1600	1610	1650	1680	1700	1720	1800	
2.	1580	1640	1640	1700	1750			
3.	1460	1550	1600	1620	1640	1660	1740	1820
4.	1510	1520	1530	1570	1600	1680		

Perform an analysis of variance of these data and show that a significance test does not reject their homogeneity.
