

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.TECH MID-SEM EXAMINATION**  
**3<sup>rd</sup> SEMESTER**  
**ACY-2022-23 (ODD SEM)**

**Subject Name (Code):** PDE, Probability and Statistics (203191208)

**Branch:** Mechanical/ Automobile

**Date:** 09/08/2022

**Time:** 2:30 to 4:00

**Total Marks:** 40

**Q.1 (A) One line Questions**

Marks  
05

- 1) The relationship between mean, median and mode is .....
- 2) If  $\Sigma(x - \bar{x})^2 = 40, \Sigma(x - \bar{x})(y - \bar{y}) = -26, \Sigma(y - \bar{y})^2 = 20$  then what is the value of  $b_{yx}$ ?
- 3) Standard error for mean of hypothesis with S.D. 9 and sample size 400 is.....
- 4) If the mean of a Poisson distribution is 15 then its variance is equal to.....
- 5) The median of 20,25,30,15,17,35,26,18,40,45,50 is.....

**(B) Compulsory Question**

05

- 1) In Binomial distribution  $n = 10, p = 0.35$ . Find mean.
- 2) Find the median of the following data:

$x_i$	0	1	2	3	4
$f_i$	4	1	6	11	3

- 3) If the standard deviation of a data is 0.012. Find the variance.....
- 4) If  $r = 0.8, b_{xy} = 0.32$ , then what will be the value of  $b_{yx} =$  .....
- 5)  $P(A \cup B \cup C) =$  .....

**Q.2 Answer the following questions. (Any FOUR)**

12

- 1) Find the mode of the following:

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
$f_i$	5	9	11	13	10	7	2

- (2) Find the probability of getting at least one head in two throws of unbiased coin.
- (3) A die is thrown. If E is the event 'the number appearing is a multiple of 3' and F be the event 'the number appearing is even' then find whether E and F are independent ?
- (4) A sample of 400 students has a mean height of 171.38 cms. Can it be reasonably regarded as a random sample from a large population with mean height 171.17 and standard deviation 3.3 cms ? (Take 5% level of significance=1.96)

(5) The number of road accidents on a highway during a week is given below. Can it be considered that the proportion of accidents are equal for all days? (Take 5% significance level  $\chi^2_{tab 2} = 12.59$ )

Day	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
Number of accidents	14	16	8	12	11	9	14

**Q.3** Answer the following question. (Any TWO)

08

(1) An experiment gave the following values:

X	1	5	7	9
Y	10	15	12	21

Fit an exponential curve  $y = Ce^{-ax}$

(2) Two judges have given ranks to 10 students for their honesty. Find the rank correlation coefficient of the following data:

1 <sup>st</sup> Judge	3	5	8	4	7	10	2	1	6	9
2 <sup>nd</sup> judge	6	4	9	8	1	2	3	10	5	7

(3) A card is drawn from a pack of well-shuffled cards. Find the probability of the following events.

- 1) The card drawn is a spade.
- 2) The card drawn is a king.
- 3) The card drawn is a face card.
- 4) The card drawn is not a club.
- 5) The card drawn is either a heart or a diamond.

**Q.4** Answer the following questions.

(A) The following mistakes per Page observed in a book. Fit a Poisson distribution and test goodness of fit.

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No. of mistakes per page	No. of pages
0	211
1	90
2	19
3	5
4	0

05

(B) Three unbiased coins are tossed. Find the probability of getting  
 (i) exactly 2 heads,  
 (ii) at least one tail,  
 (iii) at most 2 heads,  
 (iv) a head on the second coin and,  
 (v) exactly 2 heads in succession

**OR**

(B) One fifth (1/5) percent of the blades produced by a blade manufacturing factory turn out to be defective. The blades are supplied in packets of 10. Use Poisson distribution to calculate approximate number of packets containing

05

- (a) no defective,
- (b) Only one defective, in a consignment of 1,00,000 packets.