Seat No:_____ **Enrollment No:_____**

PARUL UNIVERSITY

FACULTY OF IT & COMPUTER SCIENCE

B.SC.(IT)/BCA /IMCA(A.Y.-IV) Summer 2022-23 Examination

Semester: 3/4 **Date: 22/03/2023**
Subject Code: 05191206 **Time: 10:30am to 1:00pm**
Subject Name: Statistics **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Answer the followings.

A. Answer / Define the following in short. **(05)**

1. Define : Unit Vector
2. Define : Random Variable
3. Define : Sample Space
4 Define: Mutually Exclusive Event
5 Define : Equally likely event

B. Multiple choice type questions/ Give the sentence true or false. (Each of 01 marks) **(10)**

1. A vector equally inclined to axes is …..
   $\widehat{a)}\imath + \hat{\jmath} + \hat{k}$ b) $\hat{\imath} - \hat{\jmath} + \hat{k}$ c) $\hat{\imath} - \hat{\jmath} - \hat{k}$ d) $-\hat{\imath} + \hat{\jmath} - \hat{k}$
2. If P(A) = 0.6, P(B) = 0.4 and P(B/A) = 0.5 and P(A/B) = 0.75 then what is the value of $P(A \cap B)$ = …….
   a) 0.20 b) 0.24 c) 0.30 d) 0.40
3 Area of parallelogram whose diagonal is $2\hat{\imath} + \hat{\jmath} - 2\hat{k}$ and one side is $3\hat{\imath} + \hat{\jmath} - \hat{k}$ is…..
   a) $\hat{\imath} - 4\hat{\jmath} - \hat{k}$ b) $3\sqrt{2}$ sq units c) 6 sq units d) 4 sq units
4. Two events A and B are independent then $p(A \cup B) =$ …….
   a) $P(A)P(B)$ b) $P(A) + P(B) - P(A)P(B)$ c) 0 d) 1
5. What is the probability that the sun will rise at 7 p.m.?" –Choose the correct answer from the following alternatives.
   a) 1 b) 0 c) 2 d) 3
6. If a is any non - Zero vector , then $(\overrightarrow{a.\hat{\imath}}).\hat{\imath} + (\overrightarrow{a.\hat{\jmath}}).\hat{\jmath} + (\overrightarrow{a.\hat{k}}).\hat{k}$ is _____
   a) $\vec{a}$ b) b c) $\vec{c}$ d) d
7. What is the mean of 24, 45, 56, 67, 78, 91, 89, 39
   a) 67.2 b) 63.12 c) 60 d) 61.12
8. What is the mode of the following statistical data 23, 45, 12, 3, 67, 3, 89, 3, 76, 3
   a) 1 b) 2 c) 3 d) 4
9. What is the median of the following statistical data….23. 45. 56. 12. 67. 78. 4, 17
   a) 32 b) 33 c) 34 d) 35
10. What is the mean of 10.5, 11.5. 12.5, 13.5, 14.5, 15.5, 16.5, 17.5
    a) 13 b) 14 c) 15 d) 16

Q.2 Answer the followings. (3 Marks Questions.) (Any Five) **(15)**

1.Find the unit vector in the direction of sum of the vector $\vec{a} = 2\hat{\imath} - 1\hat{\jmath} + \hat{k}$ and $\vec{b} = 2\hat{\jmath} + \hat{k}$

2. In the pack of well shuffled 52 cards, find the probability of following events
   i) The card drawn is a spade
   ii) The card drawn is not a club
   iii) The card drawn is a face
3. Find the mean, median and mode of the following data
   23, 45, 34, 78, 44, 12, 3, 9, 18, 98, 203, 456, 102, 45, 309, 45

4. Draw the histogram for the following data

Class interval- (Heights in cm)	155-160	160-165	165-170	170-175	175-180	180-185	185-190	190-195
Frequency	3	2	9	7	10	5	5	1

5. Find the expected value of number of heads when two unbiased coins are tossed

6. Find the mean and mode for the following frequency distribution

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No.of students	4	6	10	20	10	6	4

Q.3 Answer the following. (5 Marks Questions)(Any three) **(15)**

1. A unbiased coin is tossed 6 times, Find the probability of getting i) exactly 4 heads and ii) atleast 4 heads
2. 100 electric bulbs are found to be defective in the lot of 5000 bulbs. Find the probability that atmost 3 bulbs are defective in the box of 100 bulbs
3. In a batch of 400 students, the height of the students is given in the following table. Draw Frequency Polygon

Height (in cm)	No of students
140-150	74
150-160	163
160-170	135
170-180	28
Total	140

4. A 200gms is placed on the meter stick 20cm from the fulcrum. An unknown mass is positioned 8cm from the fulcrum to balance the system. What is the mass of this unknown object?

Q.4 Answer the following in detail.

A. If a poison distribution is such that $3P(X = 1) = 2P(X = 3)$ then what is the mean of the distribution? **(05)**

B.(1) The mean and variance of a Binomial distribution are 15 and 6 respectively. Find the values of n and p. **(05)**

B.(2) Students from Nirma Institute of Technology spend an average of 24.3 hours per week on homework with standard deviation of 1.4 hours a) what percentage of students spends more than 28 hours per week on homework? b) what is the probability that student spend more than 28 hours per week on homework? **(05)**

OR

B.(1) For the binomial distribution n = 20 and p = 0.35. Find the mean and variance of the binomial distribution **(05)**

B.(2) A sample of 100 dry battery cells tested and found that average life of 12 hours and a standard deviation is 3 hours. Assuming the data to be normally distributed, what percentage of battery cells are expected to have life i) more than 15 hours ii) less than 6 hours iii) between 10 to 14 hours **(05)**