

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTER INTEGRATED MCA DEGREE EXAMINATION (R), DECEMBER 2023 (2020 SCHEME)

Course Code: 20IMCAT203

Course Name: Probability and Statistics

Max. Marks: 60

Duration: 3 Hours

Statistical tables and non-programmable scientific calculators up to Casio Fx991ESPlus may be permitted in the examination hall.

PART A

(Answer all questions. Each question carries 3 marks)

1. Give any three requisites of a good measure of central tendency.
2. A candidate obtained the following percentage of marks in an examination English-60, Hindi-75, Mathematics-63, Physics-59, Chemistry-55. Find the candidates weighted arithmetic mean if weights 1,2,1,3,3 respectively are allotted to the subjects?
3. How many bit strings of length four do not have two consecutive 1s?
4. A group of 30 people have been trained as astronauts to go on the first mission to Mars. How many ways are there to select a crew of six people to go on this mission?
5. Four cards are drawn at random from a pack of 52 cards. Find the probability that
 - (i) they are a king, a queen, a jack and an ace.
 - (ii) two are kings and two are aces.
 - (iii) all are diamonds.
6. A card is drawn from a well shuffled pack of playing cards. Find the probability that it is either a diamond or a king.
7. A die is thrown at random. What is the expectation of the number on it
8. Comment on the following "For a binomial distribution mean = 7 and variance = 11".
9. Find the value of c for which $f(x) = cxe^{-x}, 0 < x < \infty$ is a probability density function of a continuous random variable.
10. Give any three properties of Normal distribution.

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE I

11. The average daily wage of all workers in a factory is Rs.444. If the average daily wages paid to male and female workers are Rs.480 and Rs.360 respectively, find the percentage of male and female workers employed by the factory. (6)

OR

12. Find (i) Inter quartile range (ii) Quartile deviation (iii) Coefficient of quartile deviation for the following data

Class	0-15	15-30	30-45	45-60	60-75	75-90	90-105
Frequency	8	26	30	45	20	17	4

(6)

MODULE II

13. How many permutations of the letters ABCDEFG contain

- (i) the string BCD?
- (ii) the string CDE?
- (iii) the strings BA and GF?
- (iv) the strings ABC and DE?
- (v) the strings CAB and BED?
- (vi) the strings CBA and BED?

(6)

OR

14. How many solutions does the equation $x_1 + x_2 + x_3 = 11$ have, where x_1, x_2, x_3 are non-negative integers?

(6)

MODULE III

15. A committee of 4 persons is to be appointed from 3 officers of the Army, 4 officers of the Navy, 2 officers of the Air Force and 1 RAW agent. Find the probability of forming the committee in the following manner

- (i) There must be one from each category.
- (ii) It should have at least one from the Navy.
- (iii) The RAW agent must be in the committee.

(6)

OR

16. A Company has two plants to manufacture scooters. Plant I manufactures 80% of the scooters and plant II manufactures 20%. At plant I, 85 out of 100 scooters are rated standard quality or better. At plant II, only 65 out of 100 scooters are rated standard quality or better.

- (i) What is the probability that scooter selected at random came from plant I if it is of standard quality?
- (ii) What is the probability that the scooter came from plant II if it is of standard quality?

(6)

MODULE IV

17. Fit a binomial distribution to the following data

X	0	1	2	3	4
f	28	62	46	10	4

(6)

OR

18. Between the hours 2 P.M. and 4 P.M. the average number of phone calls per minute coming into the switch board of a company is 2.35. Find the probability that during one particular minute, there will be at most 2 phone calls. (6)

MODULE V

19. The daily wages of 1000 workmen are normally distributed with a mean of Rs.70 and with a standard deviation of Rs.5. Estimate the number of workers whose daily wages will be (6)
- (i) between Rs.70 and 72
 - (ii) between Rs.69 and 72
 - (iii) more than Rs.75

OR

20. The mileage which car owners get with a certain kind of radial tire is a random variable following an exponential distribution with mean 40,000 km. Find the probabilities that one of these tires will last (6)
- (i) at least 20,000 km
 - (ii) at most 30,000 km
