SECTION — C (3 × 10 = 30 Marks)

Answer Any THREE Questions

16. Use the method of least squares to fit the straight line $y = a + bx$ to the data given below

x	0	1	2	3	4
y	1	2.9	4.8	6.7	8.6

17. If it rains, a rain coat dealer can earn Rs 500 per day. If it is a dry day, he can lose Rs 100 per day. What is his expectation, if the probability of rain is 0.4?

18. A radioactive source emits 4 particles on average during a five-second period. (a) Calculate the probability that it emits 3 particles during a 5-second period. (b)Calculate the probability that it emits at least one particle during a 5-second period. (Apply Poisson Distribution)

19. Recent studies have shown that 20% of Americans fit the medical definition of obese. A random sample of 100 Americans is selected and the number of obese in the sample is determined. What is the probability that the sample proportion is greater than 0.24?

20. Write the types of single factor experimental design and explain them.

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BACS42 — STATISTICAL METHODS AND THEIR APPLICATIONS II

Time : Three hours   Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Give the goal of curve fitting.

2. State normal equations for fitting a second degree polynomial $y = a + bx + cx^2$.

3. What is sample space?

4. State Baye's Theorem.

5. What are the 4 requirements needed to be a binomial distribution?

6. How do you find the Z value in normal distribution?

7. Which test is used when sample size is more than 30?

8. Define standard deviation.

9. What is analysis of variance?

10. What are the components of experimental design?

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SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Find the normal equation for fitting the curve $y = a + bx + cx^2$, where given data is as

x	1	2
y	0	3

Or

(b) Explain the least square method for fitting a curve.

12. (a) A bag contains a number of coins, one of which is a two-headed coin and the rest are fair coins. A coin is selected at random and tossed. If the probability that the toss results in a head is 7/12, then how many fair coins are in the bag?

Or

(b) Let Y be the outcome when a single and fair die is rolled. If $E(Y) = 3.5$ and var $(Y) = 35/12$ Evaluate $P(Y \geq 6)$.

13. (a) What is the difference between binomial Poisson and Normal distributions?

Or

(b) Wool fibre breaking strengths are normally distributed with mean m = 23.56 Newtons and standard deviation, $\sigma = 4.55$. What proportion of fibres would have a breaking strength of 14.45 or less? Draw a diagram, label and shade area required:

14. (a) You take a random sample from some population and form a 96% confidence interval for the population mean μ. Which quantity is guaranteed to be in the interval you form?

Or

(b) How do you test proportions for hypothesis?

15. (a) Describe one and two way classifications.

Or

(b) What are the 3 principles of experimental design? Explain them.