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Question Paper Code: 53250

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fourth/Fifth Semester

Mechanical Engineering

MA 6452 – STATISTICS AND NUMERICAL METHODS

(Common to Mechanical Engineering(Sandwich)/Automobile Engineering/Mechatronics Engineering)

(Regulation 2013)

Time: Three hours

Maximum: 100 marks

Use of statistical tables is permitted.

Answer ALL questions.

PART A — $(10 \times 2 = 20 \text{ marks})$

- 1. Write any two importance uses of normal curve.
- 2. Write any two Characteristics of χ^2 test.
- 3. State about advantages of a completely randomized experimental design
- 4. How to construct Latin square?
- 5. Write Newton Raphson method for the solution of f(x) = 0.
- 6. Define power method.
- 7. State Newton's divided difference interpolation formulae.
- 8. Write trapezoidal rule.
- 9. State modified Euler formula.
- 10. Define fourth order R.K method.

PART B — $(5 \times 16 = 80 \text{ marks})$

11. (a) In a large city A 20% of a random sample of 900 school boys had a slight physical defect. In another city B 18.5% of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant?

Or

(b) Machinist is making engine parts with arc diameters of 0.7 inch. A random sample of 10 parts shows a mean diameter of 0.742 inch with a standard deviation of 0.040 inch. Compute the statistic to test the work is meeting the specification.

12. (a) Three varieties A, B, C of a crop are tested in a randomized block design with 4 replications. The plot yields in pounds are as follows.

Analyze experiential yield and start your conclusion.

Or

(b) The following table gives the number of refrigerators sold by 4 salesmen in 3 months May, June, July.

Month	Salesman					
May	50	40	48	39		
June	46	48	50	45		
July	39	44	40	39		

Is this a significant difference in the sales made by 4 salesmen?

Is this a significant difference in the sales during different month?

13. (a) Solve the system of equations by Gauss elimination method x + 2y + z = 3, 2x + 3y + 3z = 10, 3x - y + 2z = 13.

Or

- (b) Find the real positive root $3x \cos x 1 = 0$ by Newton Raphson method. Correct to three decimal places.
- 14. (a) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using trapezoidal rule with h=0.2. Hence obtain an approximate value of π .

Or

(b) From the following table find f(x) using Newton's interpolation formula

x;	1	2	7	8
f(x):	1	5	5	4

15. (a) Apply fourth order R-K method to find y(0.2) given y' = x + y, y(0) = 1.

Or

(b) Given y' = y and y(0) = 1 determine the values of y at x = 0.01(0.01)(0.04) by Euler method.