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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 × 2 = 20 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 × 16 = 80 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.

A	6	C	5	A	8	B	9
C	8	A	4	B	6	C	9
B	7	B	6	C	10	A	6

Analyze experimental 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.