Reg. No. :

Question Paper Code: 54023

B.E./B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Mechanical Engineering

15UMA423 - STATISTICS AND NUMERICAL METHODS

(Regulation 2015)

(Statistical tables may be permitted)

Duration: One hour   Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. If an individual rejects a true null hypothesis, then she/he has   CO1- R
    (a) Type I error   (b) Type II error   (c)) one tailed   (d) two tailed

2. The form of the alternative hypothesis can be: CO1- R
    (a) one-tailed   (b) two-tailed
    (c) neither one nor two-tailed   (d) Type I error

3. Degree of freedom for SSE in RBD is   CO2- R
    (a) (c-1)(r-1)   (b) (c-1)   (c) (r-1)   (d) n-k

4. The conclusion of ANOVA based on   CO2- R
    (a) F-test   (b) t-test   (c) Chi-Square test   (d) Normal

5. Iteration method is a   CO3- R
    (a) direct method   (b) indirect method   (c) self correcting method   (d) step by step

6. What is the order of convergence of Newton-Raphson method?   CO3- R
    (a) 1   (b) 2   (c) 3   (d) 4

7. The backward difference operator is denoted by the symbol   CO4- R
    (a) nable   (b) delta   (c) omege   (d) alpha

8. The order of convergence of cubic spline is   CO4- R
    (a) 4   (b) 6   (c) 8   (d) 2

9. What is the restriction on the number of intervals for Simpson's 3/8   CO5- R
    rule?
    (a) Odd   (b) Even   (c) Multiple of 3   (d) None

10. Simpsons $3/8^{th}$ rule is applicable only when   CO5- R
    (a) multiple of 3   (b) multiple of 6   (c) multiple of 8   (d) multiple of 24

(Answer any three of the following questions)

11. Two independent samples of 8 and 7 items respectively had the following values.   CO1- App   (8)

Sample 1	9	11	13	11	15	9	12	14
Sample 2	10	12	10	14	9	8	10	

    Is the difference between the means of the samples significant?

12. A vertical trail was conducted at a Research station. The research   CO2- Ana   (8)
adopted for the same was five Randomized blocks of 6 plots each the
yields in lb per plot (of 1/20) of an area obtained from the experiment
are given in the following table

Blocks	Varieties					
	V_1	V_2	V_3	V_4	V_5	V_6
I	30	23	34	25	20	13
II	29	22	28	25	28	32
III	56	43	43	31	49	17
IV	38	45	36	35	32	20
V	44	51	23	58	40	30

    Analyse the design and comment on your findings

13. Solve the system of equations by Gauss seidel method   CO3- App   (8)

$$27x + 6y - z = 85$$
$$x + y + 54z = 110$$
$$6x + 15y + 2z = 72$$

14. Find $f(8)$ by Newton's divided difference formula for the following   CO4- Ana   (8)
data

    x: 4   5   7   10   11   13

    $f(x)$: 48   100   294   900   1210   2028

15. Calculate $\int_{0.5}^{0.7} e^{-x} \sqrt{x} \; dx$ taking 5 ordinates by Simpson's 1/3 rule.   CO5- E   (8)

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