Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

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B.Tech. (ME) (2012 Onwards) (Sem.–6)

STATISTICAL AND NUMERICAL METHODS IN ENGINEERING

Subject Code : BTME-604

M.Code : 71188

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Write briefly :

1. Give two properties of normal distribution.
2. What do you mean by stratified sampling?
3. A bag contains 6 white, 4 red and 10 black balls. Two balls are drawn at random. Find the probability that they will both be black.
4. Differentiate bisection and Newton-Raphson methods.
5. Discuss Modified Euler's Method.
6. Define level of significance.
7. How Histogram is different from bar chart?
8. Calculate median of this data set (1, 2, 3, 4, 5, 6, 7, 8). Round off your answer to one decimal place.
9. Mean is greater than median (True or false).
10. State Simpson's 1/3 rule.

SECTION-B

11. The specimen of copper wires drawn form a large lot have the following breaking strength (in kg. weight) :

578, 572, 570, 568, 572, 578, 570, 572, 596, 544

Test (using t-statistic) whether the mean breaking strength of the lot may be taken to be 578 kg. weight (Test at 5% level of significance and table value of t = 2.262 at 9 d.f.).

12. Consider B. Tech. class with 45 female students and 55 male students. Only 25 females have cleared a statistical exam whereas 30 males have cleared the same exam. On the basis of above information, answer the following questions :

a) What is the probability that a randomly chosen student is a male?

b) What is the probability that a randomly chosen student has cleared the exam?

c) What is the approximate probability that a randomly chosen student has cleared the exam, given the student is female?

13. Find the number of terms of the exponential series such that their sum gives the value of e^x correct to six decimal places at x = 1.

14. Find a real root of $2x - \log_{10} x = 7$ correct to four decimal places using iteration method.

15. In the table below, the values of y are consecutive terms of a series of which 23.6 is the 6^{th} term. Find the first and tenth terms of the series :

x :	3	4	5	6	7	8	9
y :	4.8	8.4	14.5	23.6	36.2	52.8	73.9

SECTION-C

16. From the table below, for what value of x, y is minimum? Also find this value of y.

x :	3	4	5	6	7	8
y :	0.205	0.240	0.259	0.262	0.250	0.224

17. Solve $10x - 7y + 3z + 5u = 6$,

$-6x + 8y - z - 4u = 5$,

$3x + y + 4z + 11u = 2$,

$5x - 9y - 2z + 4u = 7$ by Gauss-Jordan method.

18. Apply Runge-kutta method to find approximate value of y for x = 0.2, in steps of 0.1, if $dy/dx = x + y^2$, given that y = 1 where x = 0.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.