

Hall Ticket Number :

R-19

Code: 19AC41T

II B.Tech. II Semester Supplementary Examinations May / June 2024

**Numerical Methods & Probability and Statistics**

(Common to CE &amp; ME)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks CO BL

**UNIT-I**

1. Using Newton Raphson method, find the real root of  $x \log_{10} x = 1.2$  correct to five decimal places.

14M CO1 L3

**OR**

2. Using Lagrange's formula, calculate  $f(10)$  from the following table:

x	5	6	9	11
f(x)	12	13	14	16

14M CO1 L3

**UNIT-II**

3. Given that

x	4.0	4.2	4.4	4.6	4.8	5.0	5.2
y	1.3863	1.4351	1.4816	1.5261	1.5686	1.6094	1.6487

evaluate  $\int_4^{5.2} \log x dx$  by using

- (i) Trapezoidal rule (ii) Simpson's 1/3 rule and (iii) Simpson's 3/8 rule.

14M CO2 L2

**OR**

4. Find  $y(0.1)$  and  $y(0.2)$  using Runge-Kutta 4<sup>th</sup> order formula, given that

$$\frac{dy}{dx} = x + y^2 \text{ and } y(0)=1.$$

14M CO2 L3

**UNIT-III**

5. The mean of Binomial distribution is 3 and the variance is  $\frac{9}{4}$ . Find

- (i) the value of  $n$  (ii)  $P(X = 7)$  and (iii)  $P(1 < X < 6)$ .

14M CO3 L3

**OR**

6. If  $X$  is a normal variate with mean 30 and standard deviation 5. Find the probabilities that (i)  $26 < X < 40$  (ii)  $X < 45$  (iii)  $|X - 30| > 5$ .

14M CO3 L3

**UNIT-IV**

7. A sample of 900 members has a mean of 3.4 cms and S.D. 2.61 cms. Is this sample has taken from a large population of mean 3.25 cm and S.D. 2.61 cm. If the population is normal and its mean is unknown find the 95% confidence limits of true mean.

14M CO4 L1

**OR**

8. A simple sample of height of 6400 Englishmen has mean of 67.85 inches and a S.D. of 2.56 inches while a simple sample of heights of 1600 Austrians has a mean of 68.55 inches and S.D. of 2.52 inches. Do the data indicate the Austrians are on the average taller than the Englishmen?

14M CO4 L1

<b>UNIT-V</b>
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9. The time taken by workers in performing a job by method I and method II is given below:

Method I	20	16	26	27	23	22	---
METHOD II	27	33	42	35	32	34	38

Do the data show that the variances of time distribution from population from which these samples are drawn do not differ significantly?

14M CO5 L1

**OR**

10. The average breaking strength of the steel rods is specified to be 18.5 thousand pounds. To test this sample of 14 rods were tested. The mean and standard deviations obtained were 17.85 and 1.955 respectively. Is the result of experiment significant?

14M CO5 L1

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Hall Ticket Number :

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**R-19**

**Code: 19A144T**

II B.Tech. II Semester Supplementary Examinations May/June 2024

## Hydraulics Engineering

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks CO BL

### UNIT-I

1. For the velocity profile for laminar boundary layer flows given as  $u/U = 2(y/\delta) - (y/\delta)^2$  find an expression for shear stress ( )
- OR**
2. a) Define laminar boundary layer, turbulent boundary layer
- b) What is meant by laminar sub-layer and boundary layer thickness ( $\delta$ )

### UNIT-II

3. Find the slope of the bed of a rectangular channel of width 5 m when depth of water is 2 m and rate of flow is given as 20 m<sup>3</sup>/s. Take Chezy's constant C is 50.
- OR**
4. Describe the classification of flow in channels

### UNIT-III

5. Derive the force on the inclined plate moving in the direction of jet
- OR**
6. Find the force exerted by a jet of water of diameter 75 mm on stationary flat plate, when the jet strikes the plate normally with velocity of 20 m/s.

### UNIT-IV

7. Define the draft tube. Draw the different types of draft tubes.
- OR**
8. A Kaplan turbine develops 24647.6 KW power at an average head of 39 m. Assuming a speed ratio of 2, flow ratio 0.6, diameter of the boss equal to 0.35 times the diameter of the runner and overall efficiency of 90%, calculate the diameter of the turbine.

### UNIT-V

9. A centrifugal pump having outer diameter equal to two times the inner diameter and running at 1000 r.p.m. works against a total head of 40 m. The velocity flow through the impeller is constant and equal to 2.5 m/s. The vanes are set back at an angle of 40° at outlet. If the outer diameter of the impeller is 500 mm and width at outlet is 50 mm, determine vane angle at inlet.
- OR**
10. Explain about main parts of a centrifugal pump with a neat sketch

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Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.