

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**B.Tech II Year I Semester Supplementary Examinations June-2024**

**PROBABILITY, NUMERICAL METHODS AND TRANSFORMS**

**(Electrical & Electronics Engineering)**

**Time: 3 Hours**

**Max. Marks: 60**

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

1 a Out of 15 items 4 are not in good condition 4 are selected at random. CO1 L1 6M  
Apply the probability that (i) All are not good (ii) Two are not good

b What is the probability that a card drawn at random from the pack of CO1 L2 6M  
playing cards may be either a queen or a king?

OR

2 a Determine (i)  $P(B/A)$  (ii)  $P(A/B^c)$ , if A and B are events with  $P(A) = \frac{1}{3}$  CO1 L5 6M

$$P(B) = \frac{1}{4}, P(A \cup B) = \frac{1}{2}.$$

b A businessman goes to hotel X, Y, Z, 20%, 50%, 30% of the time CO1 L5 6M  
respectively. It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels  
have faulty plumbing what is the probability that businessman's room  
having faulty plumbing is assigned to hotel Z

**UNIT-II**

3 Find a positive root of  $f(x) = e^x - 3$  correct to two decimal places by CO2 L1 12M  
Bisection method.

OR

4 Using Newton's forward interpolation formula, Obtain the value of  $f(x)$  CO2 L3 12M  
when  $x = 1.4$ .

$x$	1.1	1.3	1.5	1.7	1.9
$f(x)$	0.21	0.69	1.25	1.89	2.61

**UNIT-III**

5 Tabulate  $y(0.1)$ ,  $y(0.2)$  and  $y(0.3)$  using Taylor's series method given that CO3 L2 12M  
 $y' = y^2 + x$  and  $y(0) = 1$

OR

6 Evaluate  $\int_0^1 \frac{1}{1+x} dx$  (i) by Trapezoidal rule and Simpson's  $\frac{1}{3}$  rule. CO3 L5 12M

(ii) Using Simpson's  $\frac{3}{8}$  rule and compare the result with actual value.

**UNIT-IV**

7 a Determine the Laplace transform of CO4 L5 6M  
 $f(t) = e^{3t} - 2e^{-2t} + \sin 2t + \cos 3t + \sinh 3t - 2\cosh 4t + 9.$

b Find the Laplace transform of  $f(t) = \frac{1 - \cos at}{t}$  CO4 L1 6M

**OR**

- 8 Applying Laplace transform method to solve  $y'' - 3y' + 2y = 4t + e^{3t}$  where  $y(0) = 1, y'(0) = 1$  CO4 L3 12M

**UNIT-V**

- 9 a Determine the value of  $Z[(-2)^n]$  CO5 L3 6M  
b Find  $Z^{-1}\left[\frac{z}{z^2 + 11z + 24}\right]$  CO5 L3 6M

**OR**

- 10 Solve  $y_{n+2} + 2y_{n+1} + y_n = n$  using the Z-transform, given that  $y_0 = y_1 = 0$  CO5 L3 12M

**\*\*\* END \*\*\***