

**Reg. No:**

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

**B.Tech II Year I Semester Regular Examinations Nov/Dec 2019**  
**TRANSFORM & DISCRETE MATHEMATICS**  
(CE&AGE)

Time: 3 hours

Max. Marks: 60

**PART-A**

(Answer all the Questions 5 x 2 = 10 Marks)

- 1 a Find  $L(\sqrt{t})$ . 2M  
 b Write inverse Fourier sine transform. 2M  
 c Define a Normal group. 2M  
 d State Multinomial theorem. 2M  
 e State handshaking theorem. 2M

**PART-B**

(Answer all Five Units 5 x 10 = 50 Marks)

**UNIT-I**

- 2 a Find the Laplace transform of  $f(t) = e^{-4t} \int_0^t \frac{\sin 3t}{t} dt$ . 5M  
 b Find the Laplace transform of  $f(t) = t e^{2t} \sin 3t$ . 5M

**OR**

- 3 a Find  $L^{-1}\left(\tan^{-1}\left(\frac{2}{s^2}\right)\right)$ . 5M  
 b Find the inverse Laplace transform of  $\frac{s^2}{(s^2 + a^2)(s^2 + b^2)}$ . 5M

**UNIT-II**

- 4 Find the Fourier sine and cosine transforms of  $f(x) = \frac{e^{-ax}}{x}$  and deduce that 10M  

$$\int_0^{\infty} \frac{e^{-ax} - e^{-bx}}{x} \sin sx \, dx = \tan^{-1}\left(\frac{s}{a}\right) - \tan^{-1}\left(\frac{s}{b}\right).$$

**OR**

- 5 Find the inverse Fourier sine transform  $f(x)$  of  $F_s(p) = p^n e^{-ap}$ . 10M

**UNIT-III**

- 6 Show that the  $n^{\text{th}}$  root of unity forms an abelian group with usual multiplication. 10M

**OR**

- 7 a Prove that the order of a subgroup of a finite group divides the order of the group? 5M  
 b Prove that the kernel of a homomorphism from  $(G, *)$  to  $(H, \Delta)$  is a subgroup of  $(G, *)$ . 5M

**UNIT-IV**

8 In how many ways we can choose 3 of the numbers from 1 to 100. So that their sum is divisible by 3. **10 M**

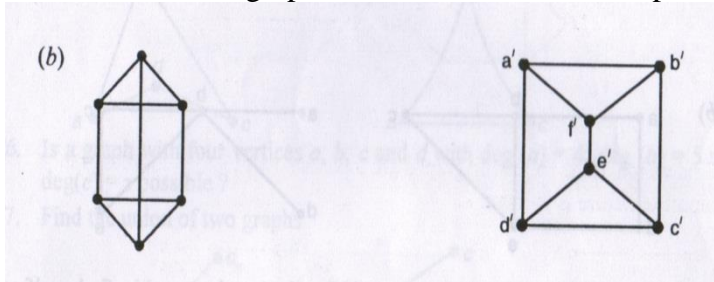
**OR**

9 a Applying pigeon hole principle show that of any 14 integers are selected from the set  $S = \{1,2,3,\dots,25\}$  there are at least two whose sum is 26. Also write a statement that generalizes this result. **5M**

b Show that if 8 people are in a room, at least two of them have birthdays that occur on the same day of the week. **5M**

**UNIT-V**

10 a Show that the two graphs shown below are isomorphic. **5M**



b Explain about the Rooted tree with an example? **5M**

**OR**

11 Define a complete graph with suitable example. Also, prove that a complete graph  $K_n$  is a planar iff  $n \leq 4$ . **10 M**

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