GUJARAT TECHNOLOGICAL UNIVERSITY

Lukhdhirji Engineering College Morbi-2

Mechanical Engineering Department

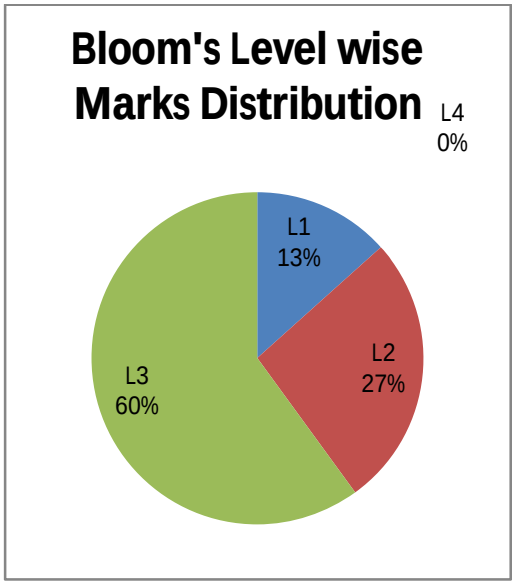
BE Sem 5 Mid Semester Examination 2021-22

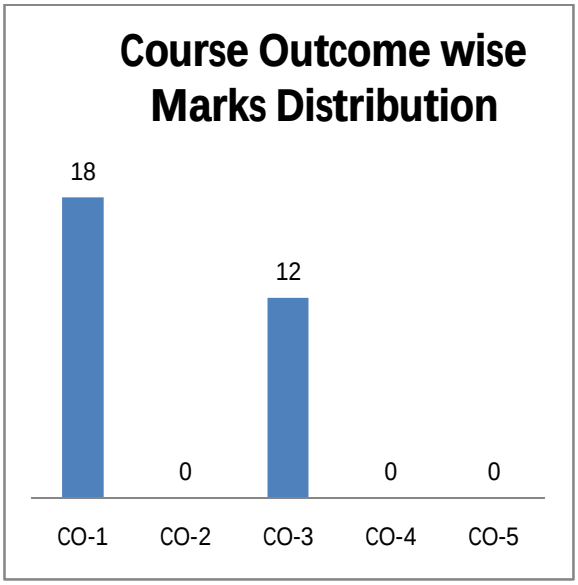
Subject Code: **3151909** Subject Name: **Heat Transfer**

Total Marks: **30**

Mode Of Exam: ***Online on MS Team Platform***

Quiz		Marks	CO	BL	PI
Q-1,3,5,6,7	Conduction Heat Transfer	**[10]**	**CO1**	**L1,L2,L3**	**1.2.1**
Q-3	Radiation Heat Transfer	**[10]**	**CO3**	**L1,L2,L3**	**1.2.1**





BL –Bloom's Taxonomy Levels (1-Remembering, 2-Understanding, 3 –Applying, 4 –Analysing, 5 –Evaluating, 6 -Creating)

CO –Course Outcome

PO –Program Outcomes; PI Code –Performance Indicator Code

Sub Incharge: **DQAC Members:**

2021_Mid Exam_HT_3151909

* This form will record your name, please fill your name.

1. Define Thermal conductivity and Thermal diffusivity.
   (2 Points)

2. Define momochromatic emissivepower and total emissive power,
   (2 Points)

3. Explainhow fins can increase the rate of heat transfer. Mention the most common types of fins and sketch them. Give some practical examples of fins. (UPLOAD FILE IN SHARED GOOGLE FORM IN YOUR WHATS APP GROUP,DONT ANSWER HERE)
   (4 Points)

4. Explain Kirchoff's Law of radiation heat transfer.(UPLOAD FILE IN SHARED GOOGLE FORM IN YOUR WHATS APP GROUP,DONT ANSWER HERE)
(4 Points)

5. A steel pipe (k= 35W/mK) with inner radius 25mm and outer radius 30 mm is insulated with 85% magnesia insulation (k -0.055 W/mK) .The temperature interface between pipe and insulation is 300 0C on outside insulation must not excced 70 0C,with permissible heat loss of 700 W/m.The minimum thickness of insulation is
(3 Points)

- 5mm
- 8mm
- 10mm
- 12mm

6. For above data,the temperature of insde surface of pipe is
(3 Points)

- 300 0C
- 550 0C
- 250 0C
- 240 0C

7. An alluminium fin (k= 200 W/mK,2.5 cm long and 3.5 mm thick) protrudes from a wall.The base is at 420 0C and surrounding air temperature is 30 0C.Determine the heat dissipated from the fin and fin efficiency for the fin is of finite length and heat loss from tip is negligible.Take h =11 W/m2K.
(6 Points)

- ◯ 90.5
- ◯ 99.35
- ◯ 95.37
- ◯ 92.36

8. Two parallel plates placed 1 m apart have dimensions of 200 cm x 100 cm.THe plates have temperature of 727 0C (Emissivity=0.3) and 227 0C (Emissivity=0.5) respectively.THe plates are placed in a large room,for which walls are at 27 0C.Determine the rate of heat loss by radiation from each plate and the heat gain by walls. Take F12= 0.232
(6 Points)

- ◯ 25.42 kW , -1.166 kW , 24.93 kW
- ◯ 22.42 kW , -3.166 kW 34.93 kW
- ◯ 35.42 kW , 2.166 kW , 44.93 kW
- ◯ 15.42 kW , -1.136 kW , 22.93 kW