

R17

Code No: 5421AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech I Semester Examinations, June/July - 2019

ADVANCED MATERIALS FOR THERMAL SYSTEMS

(Thermal Engineering)

Time: 3hrs

Max.Marks:75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

5 × 5 Marks = 25

- 1.a) What are the surface treatments for steel? Why is it important? [5]
- b) What are the effects of radioactive waves on creep and fatigue of rubbers? [5]
- c) Write a note on quantum dots of solar energy. [5]
- d) What are the materials used in thermal power production? [5]
- e) Explain CO₂ separation. [5]

PART - B

5 × 10 Marks = 50

- 2.a) Write a note on classification of steel.
 - b) How do you evaluate creep behavior? [5+5]
- OR**
- 3.a) What are the applications of fatigue test?
 - b) What are the tests used to check brittleness of a material? Explain any one test. [5+5]
4. Explain the construction of a nuclear reactor with a neat sketch. [10]
- OR**
5. Explain the properties of materials used for a) control rods b) coolant c) moderator and d) shielding. [10]
6. What are conductive membranes? Explain their importance. [10]
- OR**
7. What are the materials used for high temperature fuel cells? Explain their properties. [10]
8. Explain the process of thermal power generation with a sketch. [10]
- OR**
9. What is TBC? Why is it important in power generation? What are the materials used? [10]
10. What is sustainable energy economy? How can we achieve it? [10]
- OR**
11. How can the wastage be reduced in manufacturing processes? [10]