



B.E/B.TECH DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Fourth Semester

MECHANICAL ENGINEERING

U18MET4007: Basics of Mechanical Engineering

COURSE OUTCOMES

- CO1:** Explain principles of thermodynamics, renewable energy and power plants.
CO2: Explain the working principle and combustion characteristics of IC Engines.
CO3: Explain the working principle of VCR & VAR systems.
CO4: Understand and explain the various manufacturing processes and power transmission.
CO5: Explain various types of power transmission.

Time: Three Hours

Maximum Marks: 100

**Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)**

- | | |
|---|-----------------------|
| 1. Define the terms:
Thermodynamics and Energy. | COL [K _L] |
| 2. Write the significance of dryness fraction. | COL [K _L] |
| 3. Analyze thermal power plants are not suitable for supplying fluctuating loads. | COL [K _L] |
| 4. Name the three moderators used in nuclear power plants. | COL [K _L] |
| 5. What will happen, when diesel fuel is accidentally filled to a petrol car? | COL [K _L] |
| 6. You are appointed as an engineer in a refrigerator manufacturing company and are assigned by a task of selecting the refrigerant. While selecting the refrigerant point out the desirable properties you consider? | COL [K _L] |
| 7. Mention the importance of forging and rolling. | COL [K _L] |
| 8. Compare soldering and brazing process. | COL [K _L] |
| 9. What is the difference between a simple gear train and a compound gear train? Explain with the help of sketches. | COL [K _L] |
| 10. Write the advantages of rope drives. | COL [K _L] |

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

- | | | | | | |
|-----|----|--|---|-----|-------------------|
| 11. | a) | Derive the expression for steady flow of energy equation. | 8 | COL | [K _L] |
| | b) | With a neat sketch, derive the expression for work done and internal energy for polytropic processes. | 8 | COL | [K _L] |
| 12. | a) | Examine the construction and working of Nuclear power plant with a layout. | 8 | COL | [K _L] |
| | b) | i) Draw a schematic diagram of a hydro plant and explain the operation. (4) | 8 | COL | [K _L] |
| | | ii) Compare Kaplan turbine and Francis turbine (4) | | | |
| 13. | a) | With a neat sketch, compare the working of two stroke and four stroke internal combustion engines. | 8 | COL | [K _L] |
| | b) | Demonstrate the working of a vapour compression refrigeration system with the help of a neat sketch. | 8 | COL | [K _L] |
| 14. | a) | Discuss briefly with neat sketches the processes of extrusion. Discuss their relative merits and demerits. | 8 | COL | [K _L] |
| | b) | With a neat sketch, explain the arc and gas welding process. Discuss their relative merits and demerits. | 8 | COL | [K _L] |
| 15. | a) | Sketch two teeth of a gear and discuss the following: face, flank, top land, bottom land, addendum, dedendum, tooth thickness, space width and circular pitch. | 8 | COL | [K _L] |
| | b) | Discuss the effect of slip of belt on the pulleys on the velocity ratio of a belt drive. | 8 | COL | [K _L] |
| 16. | a) | Draw and explain the sequence of operations of a two stroke cycle petrol and diesel engine. | 8 | COL | [K _L] |
| | b) | With the help of a neat sketch, explain the ocean thermal energy conversion system. | 8 | COL | [K _L] |
