Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. END SEMESTER EXAMINATIONS, MAY 2025

MINING ENGINEERING
FOURTH SEMESTER
**ME 5404 BASIC MECHANICAL ENGINEERING FOR MINING**

(Regulation 2019)

Time:3hrs Max.Marks: 100

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|---|---|
| CO1 | ability to use of thermal experiments related to IC and refrigeration and airconditioning |
| CO2 | ability to use of various engineering design experiments |

**BL – Bloom's Taxonomy Levels**
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

## PART- A (10x2=20Marks)
(Answer all Questions)

| Q.No. | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1 | State second law of thermodynamics | 2 | 1 | L1 |
| 2 | Write the difference between free and forced convection | 2 | 1 | L1 |
| 3 | Name any four parts of a IC engine | 2 | 1 | L1 |
| 4 | Define Coefficient Of Performance in a refrigeration system | 2 | 1 | L1 |
| 5 | State laws of gearing | 2 | 2 | L1 |
| 6 | Write the classifications of gears | 2 | 2 | L1 |
| 7 | Define degree of freedom | 2 | 2 | L1 |
| 8 | Draw the displacement diagram for simple harmonic motions | 2 | 2 | L2 |
| 9 | Write the difference between free and forced vibrations | 2 | 2 | L1 |
| 10 | Write the classification of air compressors | 2 | 2 | L1 |

## PART- B (5x 13 = 65 Marks)

| Q.No. | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 11 (a) | Explain the first law of thermodynamics for open and closed systems | 13 | 1 | L3 |
| | OR | | | |
| 11 (b) | Write in detail with neat sketches, the difference between conduction, convection and radiation processes. | 13 | 1 | L3 |
| | | | | |
| 12 (a) | Explain in detail with a neat sketch , the working of a two stroke petrol engine | 13 | 1 | L3 |
| | OR | | | |
| 12 (b) | Explain the working of a four stroke diesel engine with a neat sketch | 13 | 1 | L3 |
| | | | | |
| 13 (a) | Write in detail with a neat sketch, the classifications of flat belt drives | 13 | 2 | L3 |

| | | | | |
|---|---|---|---|---|
| | OR | | | |
| 13 (b) | Explain in detail with a neat sketch, the working of mechanical clutch | 13 | 2 | L3 |
| | | | | |
| 14 (a) | Sketch and describe the working of Whitworth quick return motion mechanism | 13 | 2 | L3 |
| | OR | | | |
| 14 (b) | Explain in detail with a neat sketch, the working principle of ratchet and pawl mechanism | 13 | 2 | L3 |
| | | | | |
| 15 (a) | Explain in detail with a neat sketch , the working of a multi stage air compressor | 13 | 2 | L3 |
| | OR | | | |
| 15 (b) | Write in detail with neat sketches, the difference between the longitudinal, transverse and torsional free vibrations. | 13 | 2 | L3 |

## PART- C (1x 15=15Marks)

(Q.No.16 is compulsory)

| Q.No. | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 16. | Explain in detail with a neat sketch, the working of a vapour compression refrigeration system | 15 | 1 | L3 |