

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End-Semester Examination – Summer 2022

Course: T.Y. B.Tech.

Branch: Mechanical Engineering

Semester: VI

Subject Code & Name: BTMEC603 / Applied Thermodynamics-II

Max Marks: 60

Date: 20-08-2022

Duration: 3.45 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO), on which the question is based, is mentioned in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

| | Level/CO | Marks |
|--|----------|-------|
| Q. 1 Solve Any Two of the following: | | |
| A) Classify different types of I.C. Engines | BL4/CO1 | 6 |
| B) Draw and explain Diesel Cycle with the help of P-V & T-S diagrams. | BL4/CO1 | 6 |
| C) Derive an expression for efficiency of Otto cycle. | BL6/CO1 | 6 |
| $\eta_{otto} = 1 - \frac{1}{r^{(\gamma-1)}}$ | | |
| Where, r is compression ratio and γ is adiabatic index | | |
| Q.2 Solve Any Two of the following: | | |
| A) Draw circuit diagram of a coil/battery ignition system. Write functions of its important components. | BL2/CO2 | 6 |
| B) Write as short note on 'emission regulation norms' | BL3/CO2 | 6 |
| C) A 4-cylinder, 4-Stroke, petrol-engine works on indicated mean effective pressure (MEP) of 6 bar and engine speed of 1250 rpm. Find the swept volume and indicated power developed by engine if piston diameter is 100 mm & stroke length is 150 mm. Also calculate the brake power available at crank shaft if mechanical efficiency is 75% | BL3/CO2 | 6 |
| Q. 3 Solve Any Two of the following: | | |
| A) Classify different types of refrigerants. | BL4/CO3 | 6 |
| B) Draw and explain ideal vapour-compression refrigeration cycle on T-s and P-h diagrams. | BL3/CO3 | 6 |
| C) An NH ₃ refrigeration plant has a capacity of 20 TR. The condensation and evaporation temperatures are 35°C and -20°C respectively. Refrigerant is dry and saturated at the entry to the compressor. There is no sub-cooling of the liquid refrigerant. If the actual COP is 0.7 times the theoretical COP, Calculate mass flow-rate of the refrigerant. | BL3/CO3 | 6 |

(Use P-h chart of NH₃ which is given at the end of question paper)

COP: Coefficient of Performance

Q.4 Solve Any Two of the following:

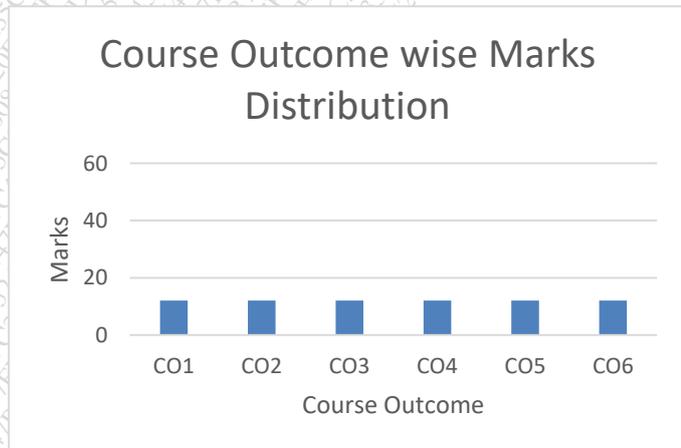
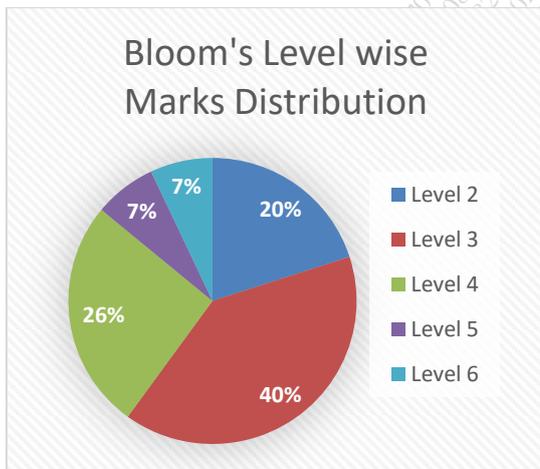
- A) Elaborate the terms SHF and BPF. BL2/CO4 **6**
- B) With reference to air-conditioning, define following terms: BL1/CO4 **6**
 - i) Dry Bulb Temperature
 - ii) Dew Point Temperature
 - iii) Relative Humidity
- C) Differentiate between horizontal axis wind-turbine and vertical axis wind-turbine. BL5/CO5 **6**

Q.5 Solve Any Two of the following:

- A) Draw schematic diagram of a simple steam power plant. Also, draw corresponding Rankine cycle on T-s diagram and explain it. BL4/CO5 **6**
- B) Describe Diesel power plant with the help of schematic diagram. BL2/CO6 **6**
- C) What factors should be taken into consideration while selecting a site for steam power plant? BL2/CO6 **6**

*** End ***

BL – Bloom’s Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analyzing, 5 – Synthesizing, 6 - Evaluating)
CO – Course Outcomes



Note: Attach this P-h chart to your answer sheet

