

**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
<b>Q. 1</b>	<b>Solve Any Two of the following:</b>		
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 $\gamma$ is adiabatic index		
<b>Q.2</b>	<b>Solve Any Two of the following:</b>		
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
<b>Q. 3</b>	<b>Solve Any Two of the following:</b>		
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 <sub>3</sub> 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 NH<sub>3</sub> which is given at the end of question paper)

COP: Coefficient of Performance

**Q.4 Solve Any Two of the following:**

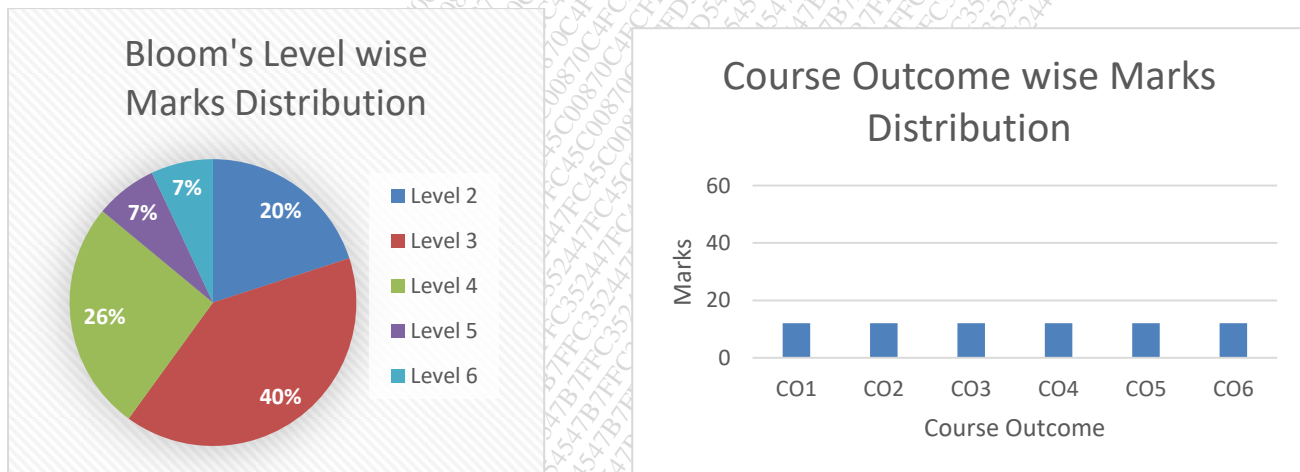
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|--|---------|---|
| A) Elaborate the terms SHF and BPF.  | BL2/CO4 | 6 |
| B) With reference to air-conditioning, define following terms:<br>i) Dry Bulb Temperature<br>ii) Dew Point Temperature<br>iii) Relative Humidity | BL1/CO4 | 6 |
| C) Differentiate 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

