

C20-M-404

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BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

DME – FOURTH SEMESTER EXAMINATION

HEAT POWER ENGINEERING-I

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

- Instructions :**
- (1) Answer **all** questions.
 - (2) Each question carries **three** marks.
 - (3) Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. What are the chemicals used in ORSAT apparatus to absorb various combustion products lime CO_2 and CO .
2. What is meant by the terms reactants and products with respect to combustion of fuels and give on example to each.
3. Define : (a) IC engine, (b) EC engine and also give one example to each.
4. List out any three advantages and three disadvantages of SI engine over CI engine.
5. Define the following terms with respect to performance of IC engines.
(a) Air fuel ration (b) Specific fuel consumption

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6. Draw the following model performance curves of SI engine.
(a) RPM Vs IP (b) RPM Vs BP (c) RPM Vs FP
7. Draw a line diagram of vane blower which does depict its functionality.
8. Identify any six uses of compressed air.
9. List out any three applications in each case (a) gas turbines and (b) jet engines.
10. Compare turbo prop engine with turbo jet engine.

PART—B

8×5=40

- Instructions :**
- (1) Answer **all** questions.
 - (2) Each question carries **eight** marks.
 - (3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. A flue gas consists of 12% CO₂ , 4.2% CO , 1.4% O₂ and rest is N₂ by volume. Convert this volumetric analysis to mass analysis.

(OR)

A flue gas consists of 25% CH₄ , 40% CO , 15% H₂ and rest is N₂ by mass. Convert this mass analysis to volumetric analysis.

12. Describe the working principle of four-stroke Diesel engine with a line diagram for each stroke.

(OR)

What is the necessity of providing cooling system for an IC engine. Describe any three methods of cooling.

14. 8 kg of air at a pressure of 2 bar and temperature 40 °C is compressed to a pressure 3.5 bar according to the law $PV^{1.25} = \text{constant}$. The air is now cooled at this pressure to 50 °C and then compressed to 10 bar according to same law. Calculate : a) work done and b) total heat rejection in the inter cooler. Assume characteristic gas constant is 0.287 kJ/kg K and specific heat at constant pressure is 1.005 kJ/kg K.

(OR)

Compare Reciprocating compressor with Rotary compressor in any five factors.

15. Describe constant volume gas turbine with a legible sketch and draw the P - V diagram of the cycle used in it.

(OR)

Describe Rocket engine with a legible sketch and mention any four applications of it.

PART—C

10×1=10

- Instructions :** (1) Answer the following question.
(2) The question carries **ten** marks.
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. Describe with a legible sketch the ignition system used in scooters.

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