

**C037511(037)**

**B. Tech. (Fifth Semester) Examination, Nov.-Dec. 2021**

**AICTE  
(New Scheme)**

**(Mech. Engg. Branch)**

**INTERNAL COMBUSTION ENGINE**

***Time Allowed : Three hours***

***Maximum Marks : 100***

***Minimum Pass Marks : 35***

***Note : Attempt all questions. Part (a) is compulsory and carries 4 marks. Attempt any two parts from (b), (c) and (d) of each carries 8 marks.***

**Unit-I**

1. (a) Define engine. 4
- (b) Explain Valve timing of 4 strokes with neat sketch. 8
- (c) Explain reasons of ignition and injection advance. 8

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- (d) Difference between S.I. and C.I. engine. 8

**Unit-II**

2. (a) Define Cetane number. 4  
(b) Explain vapour lock and carburetor icing. 8  
(c) Define preignition. Explain detonation and its effects? 8  
(d) Difference between knock in S.I. & C.I. engine. 8

**Unit-III**

3. (a) Define carburetor. 4  
(b) Explain multi point fuel injection system with neat sketch. 8  
(c) Write the properties of air-fuel mixture and limitations of simple carburetor. 8  
(d) Explain Idling and cold starting system. 8

**Unit-IV**

4. (a) Define Antifreeze mixture. 4

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- (b) Explain any one lubrication system with neat sketch. 8  
(c) Explain any one cooling system writes its advantages and limitation. 8  
(d) Explain any one ignition system. 8

**Unit-V**

5. (a) Define brake and indicated power. 4  
(b) Explain William's line method with neat sketch. 8  
(c) The following results were obtained in test on a gas engine. Gas used =  $0.16 \text{ m}^3/\text{min}$  at NTP, calorific value of gas at NTP =  $14 \text{ MJ/m}^3$ , density of gas at NTP =  $0.65 \text{ kg/m}^3$  air used =  $1.50 \text{ kg/min}$ , specific heat of exhaust gas =  $1.0 \text{ kJ/kg K}$  temp. Of exhaust gas =  $400^\circ\text{C}$ , room temperature =  $20^\circ\text{C}$ , cooling water per min =  $6 \text{ kg}$ , specific heat of water =  $4.18 \text{ kJ/kg K}$ . rise in temperature of cooling water =  $30^\circ\text{C}$  ip =  $12.5 \text{ kW}$ , BP =  $10.5 \text{ kW}$ . Draw the heat balance sheet for the test on per hour basis in kJ. 8  
(d) A trial was conducted on a single cylinder oil engine having a cylinder diameter of  $30 \text{ cm}$  and stroke  $45 \text{ cm}$ . The engine is working on the 4-stroke cycle

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and the following observation were made : Duration of trial = 54 min, total fuel used = 7 lit, calorific value = 42 mJ/kg, total number of revolution = 12624, gross imep = 7.25 bar, pumping imep = 0.35 bar net load on brake = 150 kg, diameter of brake wheel drum = 1.78, dia of rope = 4 cm, cooling water circulated = 550 lit, cooling water temp - rise = 48°C specific heat of water = 4.18 kJ/kg K specific gravity of oil = 0.8. Calculate the mechanical efficiency & also the unaccounted losses?

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