## Unit III

**5.** (a) Describe the Morse Test along with suitable assumptions for testing. Also highlight the necessary precautions for the test. **5**

(b) A 6 cylinder petrol engine operates on the four stroke cycle. The bore of each cylinder 70 mm and the stroke 100 mm. The clearance volume per cylinder is 67 $cm^3$. At a speed of 3960 rpm the fuel consumption if 19.5 kg/hr and torque developed is 140 N-m. Calculate :

(i) The brake power

(ii) The brake mean effective pressure

(iii) The brake thermal efficiency if the calorific value of the fuel is 44000 kJ/kg. **10**



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# E-34

## B. Tech. EXAMINATION, Dec. 2017

(Fifth Semester)

(B. Scheme) (Main & Re-appear)

(ME, AER)

ME-307-B

INTERNAL COMBUSTION ENGINES AND GAS TURBINES

*Time :* 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

**Note** : Attempt *Five* questions in all, selecting at least *one* question from each Unit. Assume suitable values for missing parameters (if any) and write it clearly.



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## Unit I

**1.** (a) Compare the ideal and actual Otto cycle on P-V diagram. **5**

(b) An engine working on Otto cycle has clearance of 17 per cent of the stroke volume and initial pressure of 0.95 bar and temperature 30ºC. If the pressure at the end of the constant volume heating is 28 bar, calculate :

(i) The air standard efficiency

(ii) The maximum temperature in the cycle

(iii) The ideal mean effective pressure

(iv) If the relative efficiency of the engine is 50 per cent, calculate the fuel consumption per kWh, the calorific value of the fuel used being 41900 kJ/kg. **10**

**2.** (a) Explain the principle of carburetion and for it explain Rich mixture, stochiometric mixture and lean mixture. **5**



(b) Describe a battery ignition system with the help of a sketch. **5**

(c) What are the requirements of spark plug ? **5**

## Unit II

**3.** (a) Explain the phenomenon of diesel knock. Compare it with the phenomenon of detonation in SI Engine. **7**

(b) Discuss the factors affecting delay period in CI engine. **8**

**4.** (a) Describe with a simple sketch the working of a dry sump lubrication system. **5**

(b) Discuss the effects of the following variables on the cylinder temperature : **10**

(i) Air-fuel ratio

(ii) Compression ratio

(iii) Engine power

(iv) Design of combustion chamber and material used

(v) Spark advance.



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**6.** (a) Discuss the various methods for controlling the exhaust emission from petrol engines. **7**

(b) Describe various alternative fuels for I.C engines from emission point of view. **8**

## Unit IV

**7.** (a) Discuss the working principle of centrifugal compressor and explain with the help of neat sketch. **5**

(b) Explain the phenomenon of surging. choking and stalling for axial flow compressor. **10**

**8.** Write short notes on the following : **3×5=15**

(a) Multi-stage expansion with reheating between stages.

(b) Brayton cycle

(c) Multi stage expansion with inter cooling.



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