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SF-7163

B. E. III (Sem. VI) (Mech.) Examination

May / June – 2011

I.C. Engine & Automotive Engineering

Time : Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. III (Sem. VI) (Mech.)

Name of the Subject :

☛ I.C. Engine & Automotive Engineering

☛ Subject Code No. : 7 1 6 3 ☛ Section No. (1, 2,.....) : 1&2

Seat No. :

Student's Signature

(2) Attempt all questions.
(3) Use separate answer book for each section.
(4) Use of calculator is permitted.
(5) Assume necessary data wherever required.

SECTION - 1

1 (a) Answer the following questions.

(1) Define : Stoichimetric mixture **1**

(2) Define : Valve overlap **1**

(3) Differentiate between combustion process in SI and CI engine. **3**

(4) Define : Octane number **1**

(5) For CI Engine, AS compression ratio increases for given fuel, result in _____ in ignition lag. (increase/decrease/same) **1**

(6) For SI Engine, increase in turbulence _____ detonation. (Increase/decrease/no effect) **1**

(7) For CI Engine, ignition delay decreases with increase in coolent temperature. (True/false) **1**

(8) In SI Engine, detonation occurs at _____ of combustion process. (End/Start/Mid) **1**

(b) What will be the effect on the efficiency of a diesel cycle having a compression ratio of 20 and cut of ratio is 5 % of the swept volume, if C_v increase by 1 % take C_v = 0.717 and R = 0.287 kJ/kgK. **10**

2 (a) Attempt any one of following. **8**

(1) Discuss following factor for actual cycle
   (a) Time loss factor
   (b) Exhaust blow down
   (c) Heat loss factor

(2) Derive the equation of efficiency and work output for constant volume cycle.

(b) In an engine working on diesel cycle, inlet pressure and temperature are 1 bar and 17^0c respectively. Pressure at the end of adiabatic compression is 35 bar. the ratio of expansion is 5. Calculate pressure and temperature at salient point, heat addition, heat rejection and efficiency of cycle, take ν=1.4. C_p = 1.004 kJ/kgk. **8**

3 Attempt any two. **14**

(1) Discuss the engine air fuel requirement for economy range, cruising range and power range.

(2) Discuss the factor influencing flame speed in SI engine.

(3) Explain swirl chamber.

SECTION - 2

4 (a) Write one line answers of the following. **10**

(i) What is the roll axis in suspension.
(ii) What is meant by cruciform branching.
(iii) Why are Mag wheels so called.
(iv) Why is sliding mesh gear box not preferred.
(v) What is transfer case.
(vi) Define trunion.
(vii) What is caster.
(viii) What is shimmy in steering system.
(ix) Which instrument is used to measure the specific gravity of a liquid
(x) What is the specific gravity of a fully charged battery.

(b) In a trial of a single cylinder oil engine working on dual cycle, the following observation were made : **10**

Compression ratio = 15

Oil consumption = 10.2 kg/h

Calorific value of fuel = 43890 kJ/kg

Air consumption = 3.8 kg/min

Speed = 19000 r.p.m.

Torque on the brake drum = 186 N-m

Quantity of cooling water used = 15.5 kg/min

Temperature rise = 36°C

Exhaust gas temperature = 410°C

Room temperature = 20°C

C_p for exhaust gast = 1.17 kJ/kg-K

Calculate : (i) Brake power (ii) brake specific fuel consumption (iii) Brake thermal efficiency.

Draw the heat balance sheet on minute basis.

5 Attempt any three. **15**

(1) Cone Clutch

(2) Sliding mesh gear box

(3) General Arrangement of a steering system

(4) Explain wheel alignment

6 Attempt any three. **15**

(1) Construction and working of hydraulic brake.

(2) Explain the charging and discharging curves.

(3) Magneto ignition system.

(4) Requirements of transmission system.