GANPAT UNIVERSITY

B.TECH SEMESTER VII MECHANICAL ENGINEERING

REGULAR EXAMINATION NOV-2014

SUBJECT WITH CODE: ME-2ME705 INTERNAL COMBUSTION ENGINE

TIME: 3 HOURES TOTAL MARKS: 70

INSTRUCTIONS:

SECTION-I

Q-1(A) Prove that e Air fuel Ratio for Simple Carburettor if air is assumed to be incompressible is equal to 12

$$\text{A.F. Ratio} = \frac{Cda\ Aa\ \sqrt{2\rho a.(\Delta p)}}{Cdf\ Af\ \sqrt{2\rho f\ [(\Delta p) - h\ g\ \rho f]}}$$

(B) What is the function of carburetor in an SI engine? Briefly explain with a neat sketch the operation of simple float type carburetor.

OR

Q-1 A simple carburettor has the venture of throat diameter of 8 cm and the coefficient of discharge is 0.94. The fuel orifice has the diameter of 0.5 cm and its coefficient of discharge of 0.7. find the air-fuel ratio if pressure drop amounts to 0.14 bar when (a) nozzle lip is neglected (b) nozzle lip is taken in to account and it is equal to 0.5 cm. Assume density of fuel as 780 kg/m3, approach factor as 1 and density of air as 1.293 kg/m3. 12

Q-2 (A) Explain alternative fuels for I. C. Engine and explain any one of Fuel in details. 11

(B) Enlist method of governing and explain any one of them.

OR

Q-2(A) Discuss the suitability of the following fuels in diesel engines. 11

(i) Alcohols

(ii) Vegetable oils

(iii) Biogas

(B) Explain Ignition Requirement. Also Give Types of Ignition Systems.

Q-3 **Attempt any three.** 12

(A) Write short note on Magneto ignition system.

(B) With a line diagram explain the working of common rail fuel injection system.

(C) Write a note on MPFI system for modern automobiles.

(D) Explain in brief Spark advance mechanism.

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SECTION - II

Q-4(A) Define pre-ignition with respect to SI engines and delay period with respect to a CI engines 12

(B) What is meant by abnormal combustion? Explain the phenomena of knock in SI engine.

OR

Q-4 The following observations were recorded from test on a single cylinder four stroke oil engine cylinder bore =150mm, engine stroke =250mm engine speed 420rpm, brake torque=217Nm, fuel consumption 2.95 kg/h, calorific value of fuel=44000KJ/Kg cooling water flow rate=0.068Kg/s, cooling water temperature rise=45K, specific heat capacity of cooling water=4.18KJ/kg k, Mean effective pressure=7.5 bar, calculate(a) mechanical efficiency(b) brake thermal efficiency,(c) specific fuel consumption (d) draw heat balance sheet 12

Q-5 (A) Explain with neat sketch Stages in Combustion of C. I. Engine. 11

(B) What is supercharger? Explain turbo-supercharger.

OR

Q-5(A) State effect of supercharging on following parameters 11

(i) Power ourput

(ii) Mechanical efficiency

(iii) Fuel consumption

(B) Explain the need of swirl in C.I engine combustion.

Q-6 **Attempt any three.** 12

(A) What are the basic types of Diesel smoke? What are the ways of controlling Diesel smoke?

(B) Explain the Methods of obtaining friction power and explain any one of them in detail.

(C) Write down Bharat Stages of emission norms in brief for cars and two wheelers.

(D) Explain the effect of different pollutants on human and plant life.

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