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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (2011 Onwards E-II)   (Sem.–7,8)
# I.C.ENGINES
Subject Code : DE/ME-1.1
Paper ID : [A3065]

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTION TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.**

SECTION-A

Q1 Answer briefly :

a) What is a Square Engine, and also explain air standard efficiency?

b) Draw Valve timing diagram for a 4-stroke diesel engine.

c) Define Volumetric efficiency, how this can be improved.

d) Differentiate between Air injection and solid injection.

e) Explain the phenomenon of Dissociation. Generally 10 to 20% rich mixture is used to prevent dissociation. Why? Explain.

f) What is excess air supplied in combustion? Why it is supplied?

g) What is volumetric efficiency, how it can be improved?

h) Draw flow chart for production of Petroleum.

i) Name various compensating devices of carburetor and their brief function.

j) Define mean effective pressure and explain its importance in I.C. Engine performance analysis.

SECTION-B

Q2 Discuss working of an engine working on Dual cycle.

Q3 Compare the air-standard cycle and fuel-air cycles based on

    (i) Character of the cycle

    (ii) Fuel- air ratio

    (iii) Chemical composition of the fuel

Q4 The percentage analysis of gaseous fuel by volume is given as follows: CO_2= 8%, CO=22%, O_2= 4%, H_2=30% and N_2= 36%. Determine the minimum volume of air required for complete combustion of lm^3 of gas and calculate the percentage composition by volume of the dry products of combustion. If 1.4 m^3 of air is supplied per m^3 of gas, what will be the percentage by volume of CO_2 in the dry products of combustion?

Q5 Briefly, explain direct injection of fuel in Petrol engine, stating its merits over carburetor.

Q6 What do you mean by a supercharger? Discuss its effect on :

    (i) Power output

    (ii) Thermal efficiency

    (iii) Fuel consumption.

SECTION-C

Q7 Discuss in detail the phenomenon of knocking S.I engine. Explain how it can be prevented/suppressed.

Q8 Explain working of diesel Injection system using a distributor type injection pump.

Q9 The following observations were made during a trial of 4-cylinder, four stroke gas engine having cylinder diameter of 6 cm and stroke 9 cm and rated speed=2800r.p.m. this engine is tested against a brake which has a torque arm of 0.37m. The brake load is 160N and fuel consumption is 8.986 liters/h. The sp. Gravity of petrol is 0.74 and calorific value is 44100kJ/kg. A Morse test is carried out and cylinders are cut in the order l, 2, 3 and 4 with corresponding brake load of 110, 107, 104 and 110N respectively. Calculate for this speed:

    (i) Engine torque

    (ii) Brake mean effective pressure

    (iii) Brake thermal efficiency

    (iv) Mechanical efficiency

    (v) Specific fuel consumption and indicated mean effective pressure