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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: $\text{CO}_2 = 8\%$, $\text{CO} = 22\%$, $\text{O}_2 = 4\%$, $\text{H}_2 = 30\%$ and $\text{N}_2 = 36\%$. Determine the minimum volume of air required for complete combustion of 1m^3 of gas and calculate the percentage composition by volume of the dry products of combustion. If 1.4m^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 1, 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