

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Answer any **four** from the remaining **six** questions.
 (3) Assume **suitable** data wherever **necessary**.
 (4) **Figures** to the **right** indicate **full marks**.

1. Answer any five of the following: 20
 - a) Explain firing order.
 - b) What is the difference between air standard cycle and fuel air cycle? Explain the significance of Fuel Air Cycle.
 - c) How are SI and CI engine fuels rated?
 - d) What are the advantages and disadvantages of using hydrogen in SI engine?
 - e) Explain two types of cooling systems and compare them.
 - f) Compare the various scavenging methods.
 - g) With a neat sketch explain the magneto ignition system.
2. a) Develop an expression for Air- Fuel ratio neglecting compressibility for a simple Carburetor? 10
 - b) A simple jet carburetor is required to supply 5 kg of air and 0.5 kg of fuel per minute. The fuel specific gravity is 0.75. The air is initially 1 bar and 300 K. Calculate the throat diameter of the choke for the flow velocity of 100 m/s. Velocity coefficient is 0.8. If the pressure drop across the fuel metering orifice is 0.80 of that of the choke, calculate orifice diameter assuming $C_{df}=0.60$ and $\gamma=1.4$ 10
3. a) Describe briefly the MPFI system with a neat sketch. 10
 - b) Find the air fuel ratio of four stroke, single cylinder, air cooled engine with fuel consumption time for 10 cc is 20.4 s and air consumption time for 0.1 m^3 is 16.3 s. The load is 17 kg at the speed of 3000 rpm. Find also brake specific fuel consumption in gm/kWh and brake thermal efficiency. Assume the density of air as 1.175 kg/m^3 and specific gravity of fuel to be 0.7. The lower heating value of fuel is 43 MJ/kg and the dynamometer constant is 5000. 10
4. a) Why Morse test is not suitable single cylinder engine? Describe the method of finding friction power using Morse test. 10
 - b) Explain heat balance sheet of an engine? 10
5. a) Give a brief account of air pollution due to engines. 10
 - b) What is meant by Supercharging? What is its effect on engine performance? 10
6. a) What are the advantages and disadvantages of a two stroke engine? Compare two stroke SI and CI engine. 10
 - b) In what respect four stroke cycle differs from two stroke cycle? 10
7. a) Explain : 10
 - a) Individual pump and nozzle system
 - b) Unit injector system
 - c) Common rail system
 - d) Distributor system.
 - b) Briefly explain the stages of combustion in SI engine elaborating the flame front propagation. 10