

Question Bank (K scheme)

Name of subject: POWER ENGINEERING (315371)

Unit Test: II

Course: ME

Semester: V

Chapter 3: CO3 (I C ENGINE TESTING & POLLUTION CONTROL) (2 Marks)

1. Define IP & BP.
2. Define BSFC related to I. C. Engine.
3. List the polluting emissions in exhaust of I. C. Engine..
4. State the effect of 'Air-Fuel Ratio' on Exhaust emission.
5. Name any four sensors used in I. C. engines.

Chapter 3: CO3 (I C ENGINE TESTING & POLLUTION CONTROL) (4 Marks)

1. Explain Heat Balance Sheet.
2. Discuss in brief process of combustion in SI engines with a sketch.
3. Discuss in brief process of combustion in CI engines with a sketch.
4. Draw a typical graph indicating changes in pollutants level (HC, CO and CO₂) with respect to changes in air fuel ratio.
5. A petrol Engine uses 0.272 kg of fuel per kW of brake power per hour, with calorific value as 43961 kJ/kg. The mechanical efficiency is 80% and compression ratio is 5.6

Calculate: Brake thermal efficiency, Indicated thermal efficiency, Air standard efficiency.

6. In a test of 4 cylinder 4 stroke petrol engine, 75mm bore and 100 mm stroke, the following results were obtained at full throttle at particular constant speed with fixed setting of fuel supply of 6kg/hr.

B. P. when all cylinders are working = 15.6 kW

B. P. when cylinder No. 1 cut-off = 11.1 kW

B. P. when cylinder No. 3 cut-off = 10.88 kW

B. P. when cylinder No. 2 cut-off = 11.03 kW

B. P. when cylinder No. 4 cut-off = 10.66 kW

If C. V. of fuel is 83600 kJ/kg Find: (1) Mech. efficiency (2) Indicated Thermal Efficiency

7. An I. C. engine uses 6kg of fuel per hour having calorific value of 43000 kJ/kg. The brake power developed is 21 kW. The temperature rise of cooling water is 23 degree Celsius. When the rate of flow is 11 kg/min. The temperature rise of exhaust gas is 250 degree Celsius, when rate of flow of exhaust gases is 4.6 kg/min, specific heat of water and exhaust gas are 4.187 kJ / kg K and 1 kJ / kg K respectively.

Prepare heat balance sheet on minute basis.

Chapter 4: CO4 (Air Compressor) (2Marks)

1. Enlist uses of compressed air.
2. Give classification of Air Compressor.
3. Define the term FAD & Compression Ratio.
4. State the methods to improve efficiency of air compressor.

Chapter 4: CO4 (Air Compressor) (4Marks)

1. Explain the working of two stage air compressor with perfect intercooling with the help of P-V diagram.
2. A single stage air compressor deliver air at 5 bar. The suction temperature is 20 degree Celsius and suction pressure is 1 bar. The volume of air entering the compressor is 3 m³/min. The index of compression is 1.2 Calculate isothermal efficiency and power required to drive the compressor.
3. Single acting two stage air compressor with complete intercooling delivers 6 kg/min of air at 16 bar. Assuming an intake at 1 bar and 15 degree Celsius and compression has index $n = 1.3$

Calculate:

- (1) Intermediate Pressure
- (2) The Power required to drive compressor
- (3) Isothermal Efficiency
- (4) Free air Delivered

Chapter 5: CO5 (Energy Efficiency) (2Marks)

1. Enlist the main components of a compressed air system.
2. List two factors affecting the efficiency of compressed air systems.
3. List the factors affecting performance of Refrigeration and Air Conditioning System.

Chapter 5: CO5 (Energy Efficiency) (4Marks)

1. How does ambient temperature affect the performance of an Air Conditioning system.
2. Explain energy- saving opportunity in refrigeration systems.
3. Why is regular maintenance important for RAC systems?