22232

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any FIVE of the following : **10**

(a) Define the terms : Clearance volume and Stroke.

(b) State two engine systems relevant to engine temperature control.

(c) State location of following components in I.C. engine : connecting rod, rocker arm, oil pan and flywheel.

(d) State four types of injector nozzles.

(e) List four functions of exhaust system.

(f) State four rotating components of I.C. engine to be lubricated.

(g) Define Brake thermal efficiency and air standard efficiency.

2. Attempt any THREE of the following : **12**

(a) Classify engine on basis of fuel, ignition, cooling and cylinder arrangement.

(b) Explain overhead valve and overhead cam arrangement.

(c) Describe the working of S.U. electrical fuel feed pump with help of sketch.

(d) Describe the working of pressurized water cooling system with help of sketch.

3. Attempt any THREE of the following : **12**

(a) Describe the working principle of 4-stroke petrol engine.

(b) Describe the construction of 2-stroke engine with sketch.

(c) Explain the working of magneto ignition system with sketch.

(d) Explain the working of resonator type muffler.

4. Attempt any THREE of the following : **12**

(a) Select an I.C. engine for two-wheeler with justification.

(b) Describe overhead cam arrangement with sketch.

(c) Select muffler for a scooter engine with justification.

(d) Describe construction and working of radiator pressure cap with help of sketch.

(e) In a test on 2-stroke single cylinder diesel engine, following observations were made : Bore-75 mm, Stroke - 90 mm, Engine - Speed - 1200 rpm, Mean effective pressure – 12 bar, Mean brake diameter – 0.5 m, Net brake load = 200 N, Fuel consumption – 2.04 kg/hr, C.V. of diesel – 42000 kJ/kg.

Calculate :

(i) Mechanical efficiency

(ii) Brake thermal efficiency

5. Attempt any TWO of the following : **12**

(a) (i) Choose valve operating system for 'Front Engine Front wheel drive arrangement' with justification.

(ii) Sketch valve timing diagram for four stroke C.I. engine.

(b) Describe working of Simple Carburetor.

(c) Statement : Modern motorcycle engines have wet-sump lubrication system. Justify the statement by giving reason for use of wet sump lubrication system. Sketch the lubrication system.

6. Attempt any TWO of the following : **12**

(a) Describe the Morse test procedure for multi-cylinder I.C. engine.

(b) Select lubricant with justification for following application, from given list :

(i) Four stroke S.I. engine

(ii) Four stroke C.I. engine

Sr. No.	List of Lubricant (Category/Grade)
1.	SAE20W40
2.	SN
3.	CJ-4
4.	CF-4

(c) An I.C. engine uses 6 kg fuel having C.V. 44000 kJ/kg in one hour. The brake power developed is 18 kW. The temperature of 11.5 kg/minute of cooling water was found to rise through 25 ºC. The temperature of 4.2 kg of exhaust gas with specific heat 1 kJ/kg K was found to rise through 220 ºC.

Prepare heat balance sheet for given engine operation.

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