M-403 THERMAL ENGINEERING- II
Blue Print of Model Question Paper

Sl. No.	Chapter Name	Periods Allocated	Weightage Allocated	Question Wise Distribution of Weightage			Marks Wise Distribution of Weightage		
				R	U	Ap	R	U	Ap
1	Internal Combustion Engines.	19	26	1	1	2	3	3	20
2	Performance of IC Engines.	12	16	1	1	1	3	3	10
3	Air Compressors.	16	26	1	1	2	3	3	20
4	Gas Turbines & Jet Propulsion.	14	21	1	1	1 ½	3	3	15
5	Automobile Technology	14	21	1	1	1 ½	3	3	15
TOTAL		**75**	**110**	**5**	**5**	**08**	**15**	**15**	**80**

R-Remember; U-Understanding; Ap-Application ; An- Analylising

Unit Test – 1

Q.No	Question from the Chapter	Bloom's category	Marks allocated	CO addressed
Part - A (16 marks)				
1	Internal Combustion Engines, Performance of IC Engines, Air Compressors	R,U	4	CO1, CO2,CO3
2	Internal Combustion Engines,	U	3	CO1
3	Internal Combustion Engines	U	3	CO1
4	Performance of IC Engines	U	3	CO2
5	Air Compressors	U	3	CO3
Part - B (24 marks)				
6	Internal Combustion Engines	Ap	8	CO1
7	Performance of IC Engines	Ap	8	CO2
8	Air Compressors	Ap	8	CO3

R-Remembering; U-Understanding; Ap-Applying; An- Analylising

Unit Test – 2

Q.No	Question from the topic	Bloom's category	Marks allocated	CO addressed
Part - A (16 marks)				
1	Air Compressors, Gas Turbines & Jet Propulsion, and Automobile technology.	R,U	4	CO3, CO4, CO5
2	Air Compressors	U	3	CO3
3	Gas Turbines	U	3	CO4
4	Jet Propulsion	U	3	CO4
5	Automobile technology	U	3	CO5
Part - B (24 marks)				
6	Air Compressors	Ap	8	CO3
7	Gas Turbines & Jet Propulsion	Ap	8	CO4
8	Automobile technology	Ap	8	CO5

R-Remembering; U-Understanding; Ap-Applying; An- Analylising

MODEL PAPER

Unit Test - 1

Thermal Engineering- II (M-403)

Time : 90 Minutes Total Marks: **40**

PART – A

Instructions: *1st Question having 4 one mark questions, and remaining 4 Questions carry 3 marks each*

1. (a) External combustion engine develops more power than IC engine (True/False)

   (b) Expand the terms TDC and BDC.

   (c) What is Morse test in I.C. Engines?

   (d) To calculate the volumetric efficiency in air compressors actual volume of air drawn is calculated at NTP conditions. (True/False)

2. Draw the typical indicator diagram for 4-stroke petrol engine.
3. Write any three reasons for necessity of cooling in the I.C. Engines.
4. Define the terms (a) IP (b) BP related to IC engines.
5. Write down the classification of reciprocating compressors based on any three criteria.

PART – B

Instructions: *Part B consists of **3** Units. Answer any one full question from each unit. Each question carries 8 marks and may have sub questions.*

6. Explain the working of four stroke diesel engine with neat diagrams.

(OR)

Explain the battery ignition system in the S.I engines with a neat sketch.

7. A single cylinder engine working on 4-stroke cycle has a bore of 120 mm and stroke 135 mm and runs at 650 RPM. The mean effective pressure is 6.5 bar. It consumes 10 cc of fuel in 30 seconds. The diesel oil used is having a C.V. of 42000 kJ/kg and specific gravity of 0.85. The brake wheel diameter is 900 mm and rope diameter is 20 mm. The net load on the brake is 0.11 kN. Calculate (a) Mechanical efficiency (b) Indicated thermal efficiency and (c) Brake thermal efficiency.

(OR)

In a full load test on an oil engine the following results were obtained: IP = 30 kW, BP = 24 kW, Fuel consumption = 0.128 kg/min, Cylinder circulating water = 5.9 kg/min, Temperature rise of cooling water = 49.5^0C, Temperature of exhaust gas = 387.8^0C, Temperature of engine room = 18.4^0C, Air fuel ratio = 20, Calorific value of oil = 45200 kJ/kg and Specific heat of exhaust gas = 1.05 kJ/kg K. Determine the mechanical and indicated thermal efficiencies.

8. Describe the working of a single stage reciprocating air compressor with a line diagram

(OR)

Determine the work required to compress 1 kg of air from 1 bar abs and 27^0C to 9 bar abs. The law of compression is $pV^{1.35} = C$.

MODEL PAPER

Unit Test - 2

Thermal Engineering – II (M-403)

Time : 90 Minutes Total Marks: **40**

PART – A

Instructions: *1st Question having 4 one mark questions, and remaining 4Questions carry 3 marks each*

1. (a) In the axial flow compressor the pressure ratio per stage is _____.
   (b) Gas turbine is a rotary type internal combustion engine. (True/False)
   (c) The fuel in Rocket engine is _____.
   (d) Clutch is mounted between _____
2. List the advantages of multi stage compression.
3. Write any three applications of gas turbines.
4. Write the principle of operation of jet engines.
5. List three alternative fuels used in IC engines.

PART – B

Instructions: *Part B consists of **3** Units. Answer any one full question from each unit. Each question carries 8 marks and may have sub questions.*

6. Write any eight differences between reciprocating compressors and rotary compressors.

(OR)

Determine the minimum work required to compress 1 kg of air from 1 bar abs and 27^0C to 9 bar abs i 2 stages. The law of compression is $pV^{1.35} = C$ and inter cooling is complete. If the air was compressed in one stage between the same pressure limits, what is the percentage saving of work by compressing it in two stages. Assume R = 0.287 kJ/kg K.

7. Explain the constant pressure gas turbine with neat sketch.

(OR)

Explain the turbo-jet unit with a neat sketch.

8. Describe the Working of Single plate Clutch.

(OR)

Explain the functions of principal components of conventional automobile transmission system with a line diagram.

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MODEL PAPER

D.M.E. – IV SEMESTER END EXAMINATION

THERMAL ENGINEERING -II

Time : 3 Hours Total Marks: **80**

PART – A

10 X3 = 30

Instructions: *Part A consists of **10** questions. Answer **all** questions and each question carries **three** marks.*

1. Write any three differences between battery ignition system and magnetic ignition system.
2. Draw theoretical valve diagram for a 4-stroke diesel engine.
3. List important performance parameters of I.C engines.
4. A single cylinder, 4-stroke diesel engine has a bore of 110 mm, stroke 120 mm. The indicated mean effective pressure is 375 kN/mm^2.
5. Write any three applications of compressed air in the engineering applications.
6. Write three differences between centrifugal compressors and axial flow compressors.
7. Write the applications of the gas turbines.
8. List the fuels used in Jet engines.
9. List three merits of Hydrogen using as alternative fuel.
10. State the concept of Turbocharging of automobile engines

PART – B

5 X 10 = 50

Instructions: *Part B consists of **5** Units. Answer any one full question from each unit. Each question carries 10 marks and may have sub questions.*

11. Explain the working of 4- stroke C.I. engine with neat sketches.
12. Explain the working of zenith carburettor with a neat sketch.
13. The following results were obtained from a test on a petrol engine. I.P = 30 kW; B.P = 26 Calorific Value of the fuel = 44100 kJ/kg; Fuel consumption = 8.2 kg/hr. Find (a) Indicated thermal efficiency (b) Brake thermal efficiency (c) Mechanical efficiency.
14. The following data relates to a double acting single cylinder 7.5 kW air compressor.

    Suction pressure = 0.9 bar
    Delivery pressure = 6 bar
    Average piston speed = 120 m/min
    Law of compression $PV^{1.25}$ = constant

Determine the cylinder dimensions if stroke to diameter ratio is 1.25. Neglect the clearance volume.

15) Write any eight differences between reciprocating compressors and rotary compressors.

16) Explain the closed cycle gas turbine with a line diagram and show the thermodynamic cycle on p-V diagram and T-s diagram.

17. Explain the functions of principal components of conventional automobile transmission system with a line diagram.

18 (A) Explain the Turbo-jet engine with a line diagram.
(B) Describe the Working of Single plate Clutch.

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