Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Fifth Semester - Regular) Examinations, November 2025

23BMEPC35003 – Internal Combustion Engines

(Mechanical Engg.)

Time: 3 hrs Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. Define Octane Number.	CO1	PO1
b. Write the function of feed pump and injection pump in injection system.	CO2	PO1
c. List out the effects of supercharging.	CO3	PO1
d. What are Bharat Stage emission standards?	CO4	PO1
e. Differentiate brake power and indicated power.	CO5	PO1

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions		Marks	CO #	Blooms Level
2. a.	Illustrate the working of 4 Stroke Diesel Engine with neat sketch.	5	CO1	K2
b.	Explain the theoretical valve timing diagram of 4 stroke S.I. Engine.	5	CO1	K2
	(OR)			
c.	Explain valve timing diagram and the need of valve timing diagram in I.C. engines.	4	CO1	K2
d.	Difference between 2-stroke and 4-stroke engines.	6	CO1	K2
3.a.	Explain the stages of combustion of CI Engine.	6	CO2	K2
b.	Classify the carburettor based on air flow and explain.	4	CO2	K1
	(OR)			
c.	Explain the factors affecting the flame propagation.	6	CO2	K2
d.	Illustrate throttle and port injection used in gasoline engines.	4	CO2	K2
4.a.	Explain the working of Exhaust Gas Recirculation used in IC Engines.	4	CO4	K1
b.	Write short notes on forced circulation cooling system.	6	CO3	K2
	(OR)			
c.	Write short notes on 3 way catalytic converter.	5	CO4	K2
d.	List out the six properties of lubricants and write few lubricants used in IC Engines.	5	CO3	K1
5.a.	A four-stroke SI engine delivers a brake power of 441.6 kW with a mechanical efficiency of 85 per cent. The measured fuel consumption is 160 kg of fuel in one hour and air consumption is 410 kg during one sixth of an hour. The heating value of the fuel is 42000 kJ/kg. Calculate (i) indicated power (ii) indicated thermal efficiency (iii) brake thermal efficiency.	5	CO5	K3
b.	Analyze the working and advantages of a multi-fuel engine compared to a single-fuel engine.	5	CO6	K2
	(OR)			

b.	A six-cylinder, gasoline engine operates on the four-stroke cycle. The bore of each cylinder is 80mm and the stroke is 100 mm. The clearance volume per cylinder is 70 cc. At a speed of 4000 rpm, the fuel consumption is 20 kg/h and the torque developed is 150 Nm. Calculate (i) the brake power (ii) the brake mean effective pressure (iii)brake thermal efficiency if the calorific value of the fuel is 43000 kJ/kg.	6	CO5	K3
c.	What are the key differences between CNG and LPG that make CNG a better alternative fuel?	4	CO6	K4
6.a.	Write short note on working and use of turbocharger.	4	CO2	K2
b.	An engine develops a brake power of 3.68 kW. Its indicated thermal efficiency is 30%, mechanical efficiency is 80%, calorific value of the fuel is 42 MJ/kg and its specific gravity = 0.875. Calculate (i) the fuel consumption of the engine in kg/h (ii) indicated specific fuel consumption and (iii) brake specific fuel consumption.	6	CO5	K3
	(OR)			
c.	Explain the different methods of scavenging.	4	CO2	K2
d.	A gasoline engine working on four stroke develops a brake power of 20.9 kW. A Morse Test was conducted on this engine and the brake power (kW) obtained when each cylinder was made inoperative by short circuiting the spark plug is 14.9, 14.3, 14.8 and 14.5 respectively. The test was conducted at constant speed. Find the indicated power, mechanical efficiency and bmep when all the cylinders are firing. The bore of the engine is 75 mm and the stroke is 90 mm. The engine is running at 3000 rpm.	6	CO5	K3

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