QPC: RD20BTECH349 AR 20 Reg. No

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fifth Semester – Regular) Examinations, December – 2022

BPCME5040 – Internal Combustion Engines

(Mechanical Engineering)

Time: 3 hrs Maximum: 70 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) **(1 x 10 =10 Marks)**

Q.1. Answer ***ALL*** questions [CO#] [PO#]

a. Most commonly used lubrication system in automobiles is the CO1 PO1

(i) splash system (ii) pressure system

(iii) petrol system (iv) gravity system

b. The process of breaking up or a lipoid into fine droplets by spraying is called CO4 PO1

(i) carburetion (ii) vaporisation

(iii) injection (iv) atomisation

c. Methanol (M-80) means CO4 PO1

(i) 80 % methanol and 20% gasoline (ii) 80 % gasoline and 20% methanol

(iii) 80% methanol and 20% diesel (iv) 80 % diesel and 20% methanol

d. Scavenging air in diesel engine means CO3 PO1

(i) air used for combustion sent under pressure forced air for cooling cylinder

burnt air containing products ofcombustion air used for forcing burnt gases out of engine's cylinder during the exhaust period

e. Ignition quality of diesel fuel is indicated by its CO3 PO1

(i) octane number (ii) octane number

(iii) flash point (iv) flash point

f. For CI engine fuels most preferred are CO4 PO1

(i) napthenes (ii) paraffins

(iii) olefins (iv) aromatics

g. Advantage of fuel injection in SI engine is CO2 PO1

(i) low initial cost (ii) low maintenance requirements

(iii) increased volumetric efficiency (iv) none of the above

h. Two way catalytic convertor converts reduce emission of CO3 PO1

(i) CO,HC (ii) CO,HC

(iii) CO,HC,CO_2 (iv) CO,HC,CO_2

i. What is the spray cone angle in the Pintle nozzle? CO2 PO1

(i) 60° (ii) 60°

(iii) 30° (iv) 30°

j. In actual case, the intake valve closesin 4 stroke Petrol Engine CO1 PO1

(i) 10 degree Crank Angle before TDC (ii) 0 degree Crank Angle at TDC

(iii) 05 degree Crank Angle after TDC (iv) 20 degree Crank Angle before BDC

PART – B: (Short Answer Questions) **(2 x 10 = 20 Marks)**

Q.2. Answer ***ALL*** questions [CO#] [PO#]

a. Explain the use of choke valve in a carburetor. CO1 PO1

b.	Illustrate the desired properties of a lubricant?	CO1	PO1
c.	Write the advantages of CNG and LPG over conventional fuels.	CO4	PO1
d.	Represent p-V diagram of dual cycle operated engine.	CO4	PO1
e.	Explain the basic requirements of an ignition system?	CO3	PO1
f.	Describe ignition delay?	CO3	PO1
g.	Define flash point and fire point of fuel for CI engines.	CO1	PO1
h.	Name the different injection systems in CI engine	CO2	PO1
i.	Illustrate the disadvantages of using Ethanol as a Fuel	CO4	PO1
j.	Explain carburettor depression.	CO2	PO1

PART – C: (Long Answer Questions) **(10 x 4 = 40 Marks)**

	Answer ***ALL*** questions	Marks	[CO#]	[PO#]
3. a.	The venturi of a simple carburetor has throat diameter of 35 mm and the coefficient of air flow as 0.85**.**The fuel orifice has a diameter of 2.3 mm and the coefficient of fuel flow is 0.66. The petrol surface is 5 mm below the throat. Find: (i) The air fuel ratio for a pressure drop of 0.07 bar when the nozzle lip is neglected (ii) The air fuel ratio when the nozzle lip is taken into account (iii)The minimum velocity of air flow required to start the fuel flow when nozzle lip is provided. Take density of air and fuel as 1.2 kg/m3 and 750 kg/m3 respectively.	10	CO2	PO2
	(OR)			
b.	Describe the two types of general injection systems. Why the air injection system is not used nowadays?	5	CO2	PO1
c.	Explain the working of simple carburettor with a neat diagram.	5	CO2	PO1
4. a.	Explain Ignition Timing	5	CO3	PO1
b.	Write short notes on turbocharger. List out the benefits of supercharging	5	CO3	PO1
	(OR)			
c.	Explain Single hole and Multi hole nozzle with simple diagrams	5	CO1	PO1
d.	Illustrate the working principle of Distributor type fuel injection pump.	5	CO1	PO1
5. a.	A simple jet carburetor is required to supply 5 kg of air and 0.6 kg of fuel per minute. The specific gravity of fuel is 0.7.The air is initially at 1bar and 25oC.Calculate the throat diameter of choke for a flow velocity of 90m/s. Velocity coefficient is 0.85.If the pressure drop across the fuel metering orifice is 75 % of that of the choke, calculate orifice diameter assuming coefficient of discharge for fuel to be 0.7 and γ=1.	10	CO1	PO2
	(OR)			
b.	Write short note on D-MPFI and L-MPFI	5	CO2	PO1
c.	Explain the stages of combustion in SI engine with neat sketch.	5	CO2	PO1
6. a.	Explain Battery ignition system with neat sketch with its merits and demerits.	10	CO3	PO1
	(OR)			
b.	A simple carburetor has to supply 5 kg of air per minute. Air is at a pressure of 1.013 bar and 300 K temp. find the throat diameter of the air flow velocity of 90 m/s. take coefficient of velocity as 0.8. The flow is isentropic and compressible. (c_{pair}= 1.005 Kj/kg K)	10	CO2	PO2

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