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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Automobile Engineering

Semester End Examination; February / March - 2022

Automotive Fuels and Combustion

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:

CO1: Explain available energy sources for I.C. Engines & discuss their advantages and limitation; Explain refining process of petroleum and their by-products and their properties.

CO2: Determine A/F ratio for any given fuel & Rating of SI and CI Engine fuels.

CO3: Analyze the combustion phenomena of SI & CI Engine.

CO4: Explain recent developments in the field of I.C. Engines.

CO5: Explain the constructional and working principle of multi and dual fuel Engine and their advantages and limitation.

Note: ***I) PART - A*** *is compulsory.* ***Two*** *marks for each question.*

II) PART - B*: Answer any* ***Two*** *sub questions (from a, b, c) for Maximum of* ***18 marks*** *from each unit.*

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
I a.	The difference between Otto and Diesel cycles is that in the latter heat addition is at constant_____.	2	L1	CO1	PO1
b.	Aromatics have the general formula_____.	2	L2	CO2	PO1
c.	Mention the stages of combustion in SI Engines.	2	L3	CO3	PO1
d.	Define dual fuel engine.	2	L4	CO4	PO1
e.	Mention the two methods of obtaining variable compression ratio.	2	L5	CO5	PO1
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	What are the assumptions made in air standard cycles analysis?	9	L1	CO3	PO2
b.	Discuss the problem associated with exhaustible sources of energy in present scenario.	9	L1	CO1	PO1
c.	Briefly explain the following energy sources: i) Solar energy ii) Wind power iii) Geothermal power	9	L1	CO1	PO1
	UNIT - II	**18**			
2 a.	With a neat sketch, explain the refining of petroleum.	9	L2	CO2	PO2
b.	Define and explain the following fuel properties: i) Flash and Fine point ii) Cloud and Power point iii) API and Specific gravity	9	L2	CO1	PO1
c.	Explain any three non-petroleum fuels.	9	L2	CO1	PO1

Contd... 2

	UNIT - III	**18**			
3 a.	Explain the stages of combustion in SI engine with the help of pressure crank-angle diagram.	9	L3	CO3	PO2
b.	Discuss the effect of the following engine variables on flame propagation. i) Fuel-air ratio ii) Compression ratio iii) Turbulance	9	L3	CO3	PO2
c.	What is the importance of delay period? Discuss any four variables affecting delay period.	9	L3	CO3	PO2
	UNIT - IV	**18**			
4 a.	Explain the working of a dual fuel engine with the help of P-θ diagram.	9	L4	CO4	PO1
b.	Explain the effects of the following on combustion in dual fuel engine: i) Injection timing ii) Cetane number iii) Throttling	9	L4	CO4	PO1
c.	Explain the modifications required for fuel system of a multi fuel engine.	9	L4	CO5	PO2
	UNIT - V	**18**			
5 a.	Explain the working principle of Volkswagen PCI stoatified charge engine with a sketch.	9	L5	CO5	PO2
b.	Discuss the general characteristics of stratified charge engines and mention the advantages and disadvantages of these engines.	9	L5	CO5	PO2
c.	Compare the performance of VCR engine with that of a connectional constant compression ratio engine.	9	L5	CO5	PO2

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