Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

USN | | | | | | | | | | |

Fifth Semester B.E. Degree Examination

Automotive fuels and combustion

TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		Module – 1	Marks
Q.1	(a)	List and Explain types of energy sources	10
	(b)	What is a fuel cell? With a neat sketch explain the working of fuel cell.	10
		OR	
Q.2	(a)	With a neat sketch explain petroleum refining process by fractional distillation.	10
	(b)	Interpret the following i) Cracking ii) Polymerization	10
		Module – 2	
Q.3	(a)	Explain the working of Orsat Apparatus with neat sketch	10
	(b)	Explain i) LPG as fuel for SI engine ii) Bio-diesel as a fuel for CI engine	10
		OR	
Q.4	(a)	Explain the Flue gas analysis by gas chromatography	10
	(b)	In a boiler trial the flue analysis was made, carbon 90% hydrogen 5% sulphur 0.5% by mass and rest is ash. Find the mass of air required for complete combustion. If the actual supply of air is 40% excess of this, estimate the percentage analysis of dry flue gas by mass and by volume.	10
		Module – 3	
Q.5	(a)	Explain the different stages of combustion in SI engine with P-Θ diagram	10
	(b)	Interpret the effect of engine variables on ignition lag in S.I engine.	10
		OR	
Q.6	(a)	Explain the different stages of in CI engine with P-Θ diagram	10
	(b)	With a neat sketch illustrate the concept of Delay period in CI engine	10
		Module – 4	
Q.7	(a)	With a neat sketch explain Rope brake dynamometer	10
	(b)	During a test on a single cylinder four-stroke oil engine the following observations are made. Bore = 30cm; Stroke = 45cm; Duration of trial = 1hr; Total fuel consumption = 7.6kg; Calorific value = 45,000kJ/kg; Total revolutions made = 12000; Mean effective pressure = 6 bar; Net brake load = 1.47kN; Brake drum diameter = 1.8m; Rope diameter = 3cm; Mass of jacket cooling water circulated = 550kg; Water enters at 15^0C and leaves at 60^0C. Total fuel consumption = 360kg; Room temperature = 20^0C; Exhaust gas temperature = 300^0C. Find i) Indicated and brake power ii) Mechanical efficiency iii) Develop a heat balance sheet on minute basis	10
		OR	
Q.8	(a)	Explain the William's line method for determine for the determination of friction power of the engine.	10
	(b)	Outline the Morse test for 4 cylinder engine	10
		Module – 5	

Q.9	**(a)**	List and Explain the factors affecting combustion in duel fuel engine	10
	(b)	With a neat sketch explain the working principle of duel fuel engine	10
OR			
Q.10	**(a)**	What is a Multi fuel engine? what are the requirements of a Multi fuel engine	10
	(b)	Identify the characteristics of multi fuel engine	10

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome

Question		Bloom's Taxonomy Level attached	Course Outcome	Programme Outcome
Q.1	(a)	L1,L2	CO1	1,2,3,4,6,7
	(b)	L1, L2	CO1	1,2,3,4,6,7
Q.2	(a)	L2	CO1	1,2,3,4,6,7
	(b)	L2	CO1	1,2,3,4,6,7
Q.3	(a)	L2	CO2	1
	(b)	L2	CO2	1
Q.4	(a)	L2	CO2	1
	(b)	L1,L5	CO2	1
Q.5	(a)	L2	CO3	1,2,3
	(b)	L2	CO3	1,2,3
Q.6	(a)	L2	CO3	1,2,3
	(b)	L2	CO3	1,2,3
Q.7	(a)	L2	CO4	1,2,3
	(b)	L1, L3	CO4	1,2,3
Q.8	(a)	L2	CO4	1,2,3
	(b)	L2	CO4	1,2,3
Q.9	(a)	L1, L2	CO5	-
	(b)	L2	CO5	-
Q.10	(a)	L1	CO5	-
	(b)	L3	CO5	-

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering(knowledge):L_1	Understanding Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6

Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

USN | | | | | | | | | | |

Fifth Semester B.E. Degree Examination

Automotive fuels and combustion

TIME: 03 Hours **Max. Marks: 100**

Note: 02. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		Module – 1	Marks
Q.1	(a)	Outline exhaustible and inexhaustible energy sources with examples.	10
	(b)	With a neat sketch illustrate wind energy harnessing system.	10
		OR	
Q.2	(a)	Illustrate the chemistry of petroleum	10
	(b)	Interpret the following i) Diesel index ii) Aniline point iii) cloud point iv) Pour point v) Isomerization	10
		Module – 2	
Q.3	(a)	Explain the rating of S.I and C.I engine fuels	10
	(b)	What are the properties of good air fuel mixture? explain	10
		OR	
Q.4	(a)	Explain the Flue gas analysis by gas chromatography	10
	(b)	The following is the percentage of a coal sample on mass basis: C = 85; H_2 = 8; O_2 = 10; and Ash = 2. Find i) Minimum air required for complete combustion. ii) Volumetric analysis of the product supplied iii) Assume that air contains 25% of oxygen on mass basis with 12% excess air.	10
		Module – 3	
Q.5	(a)	With a neat sketch interpret the phenomenon of knocking in S.I engine.	10
		Outline the effect of engine variables on flame propagation in S.I engine.	10
		OR	
Q.6	(a)	With a neat sketch interpret the phenomenon of knocking in C.I engine.	10
	(b)	Explain the Induction air swirl in C.I engine combustion with a neat sketch	10
		Module – 4	
Q.7	(a)	With a neat sketch explain Prony brake dynamometer	10
	(b)	Briefly explain the following terms i) Mechanical efficiency ii) Volumetric efficiency iii) Brake specific fuel consumption iv) Indicated power v) Brake power	10
		OR	
Q.8	(a)	Explain the measurement of fuel consumption in the I.C engine	10

	(b)	A 4-stroke cycle, Four cylinder petrol engine was tested at full throttle at constant speed. The cylinders have diameters 80mm and stroke 100 mm. fuels was supplied at the rate of 5.44kg/hr and plugs of the four cylinders were successively short circuited without the change of speed. The power measured was as follows. With all cylinders working = 14.7Kw; With cylinder 1 cut off = 10.1 kW; With cylinder 2 cut off = 10.3 kW; With cylinder 3 cut off = 10.4 kW; With cylinder 4 cut off = 10.2 kW. Calorific value of petrol was 41900Kj/kg. Find i) Mechanical efficiency ii) Indicated thermal efficiency iii) Frictional power	10
Module – 5			
Q.9	**(a)**	List the advantages and disadvantages of duel fuel engine	10
	(b)	Illustrate about any two types of gaseous fuels used for duel fuel engines	10
OR			
Q.10	**(a)**	What is a multi fuel engine? what are the requirements of multi fuel engine	10
	(b)	Outline the requirements of multi fuel engine modifications	10

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome

Question		Bloom's Taxonomy Level attached	Course Outcome	Programme Outcome
Q.1	(a)	L2	CO1	1,2,3,4,6,7
	(b)	L2	CO1	1,2,3,4,6,7
Q.2	(a)	L2	CO1	1,2,3,4,6,7
	(b)	L2	CO2	1,2,3,4,6,7
Q.3	(a)	L2	CO2	1
	(b)	L1, L2	CO2	1
Q.4	(a)	L1	CO3	1
	(b)	L1	CO3	1
Q.5	(a)	L2	CO4	1,2,3
	(b)	L2	CO4	1,2,3
Q.6	(a)	L2	CO4	1,2,3
	(b)	L2	CO5	1,2,3
Q.7	(a)	L2	CO5	1,2,3
	(b)	L2	CO5	1,2,3
Q.8	(a)	L2	CO1	1,2,3
	(b)	L2	CO1	1,2,3
Q.9	(a)	L1	CO2	-
	(b)	L2	CO2	-
Q.10	(a)	L1	CO2	-
	(b)	L2	CO3	-

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering(knowledge):L_1	Understanding Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6