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Enrollment No.....



Faculty of Engineering  
End Sem Examination Dec-2023  
AU3CO30 Automotive Engines

Programme: B.Tech.

Branch/Specialisation: AU

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1    i.    In a four-stroke IC engine cam shaft rotates at- 1  
(a) Same speed as crankshaft  
(b) Twice the speed of crankshaft  
(c) Half the speed of crankshaft  
(d) None of these
- ii.    Advantage of air injection system is- 1  
(a) Cheaper fuels can be used  
(b) Mean effective pressure is high  
(c) Fine atomization and distribution of the fuel  
(d) All of these
- iii.    The main purpose of a thermostat in an engine cooling system is to- 1  
(a) Allow engine to warm-up quickly  
(b) Prevent the coolant from boiling  
(c) Pressurize the system  
(d) Indicate to the driver the coolant temperature
- iv.    Mist lubrication system is mainly used in- 1  
(a) Four-stroke petrol engine    (b) Four-stroke diesel engine  
(c) Two-stroke petrol engine    (d) Wankle engine
- v.    Detonation in SI engines occur due to- 1  
(a) Preignition of the charge before the spark  
(b) Sudden ignition of the charge before the spark  
(c) Autoignition of the charge after the spark in struck  
(d) None of these

vi.	Open combustion chambers in CI engines require-	1
	(a) High injection pressures	
	(b) Accurate metering of fuel by the injection system	
	(c) Both (a) and (b)	
	(d) None of these	
vii.	Supercharging increases the power output of the engine by-	1
	(a) Increasing the charge temperature	
	(b) Increasing the charge pressure	
	(c) Increasing the speed of the engine	
	(d) Quality of fuel admitted	
viii.	Two wheelers without deflector type piston use-	1
	(a) Loop scavenging	
	(b) Uniform flow scavenging	
	(c) Reverse flow scavenging	
	(d) Cross scavenging	
ix.	Which of the following conditions should be satisfied for complete balancing of multi cylinder inline engines?	1
	(a) Primary couples should be balanced	
	(b) Secondary couple should be balanced	
	(c) Both (a) and (b)	
	(d) None of these	
x.	Multi-cylinder engines are desirable because-	1
	(a) Only balancing problems are reduced	
	(b) Only flywheel size is reduced	
	(c) Both (a) and (b)	
	(d) None of these	
Q.2	i. Define carburation.	2
	ii. Write any six comparison of Four and Two-Stroke Cycle Engines.	3
	iii. How are the injection system classified? Describe them briefly. Why the air injection system is not used nowadays?	5
OR	iv. Describe D-MPFI and L-MPFI injection system with neat sketches.	5
Q.3	i. What are the advantages of air cooling system?	2
	ii. Explain with neat sketch wet sump and dry sump lubrication systems.	8

OR	iii.	Explain the two types of cooling systems with neat sketch and compare them.	8
Q.4	i.	What is delay period and what are the factors that affect it?	3
	ii.	Briefly explain the stages of combustion in SI engines elaborating the flame front propagation.	7
OR	iii.	Explain with figures the various types of combustion chambers used in CI engines.	7
Q.5	i.	What are the limitations of supercharging in an IC engine?	4
	ii.	Briefly explain the working of the following: (a) Centrifugal supercharger (b) Roots supercharger (c) Vane supercharger Compare all the above superchargers.	6
OR	iii.	A four-stroke, four-cylinder diesel engine running at 2000 rpm develops 60 kW. Brake thermal efficiency is 30% and calorific value of fuel (CV) is 42MJ/kg. engine has a bore of 120 mm and stroke of 100 mm. Take $\rho_a = 1.15 \text{ kg/m}^3$ , air-fuel ratio=15:1 and $\eta_m = 0.8$ . calculate: (a) Fuel consumption (kg/s) (b) Air consumption ( $\text{m}^3/\text{s}$ ) (c) Indicated thermal efficiency (d) Volumetric efficiency (e) Brake mean effective pressure (f) Mean piston speed	6
Q.6		Attempt any two:	
	i.	Explain the method of balancing a single rotating mass by another rotating mass in same plane.	5
	ii.	Explain engine force analysis with the help of diagram and also derive the different forces for single slider crank mechanism.	5
	iii.	Explain the method of balancing a number of masses rotating in one plane by another mass rotating in the same plane.	5

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