

Time: 3 Hours

MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal)

✤ Answer ALL questions.

I SEMESTER M.TECH. (AUTOMOBILE ENGINEERING) END SEMESTER EXAMINATIONS, DEC/JAN 2018-2019

SUBJECT: AUTOMOTIVE ENGINES & SUBSYSTEMS [AAE 5103] REVISED CREDIT SYSTEM (27/12/2018)

Instructions to Candidates:

	 Sketch using only pencil. 	
1A.	An engine develops 55kW at full load. If its mechanical efficiency is 70 percent, find the friction power it generates. Calculate mechanical efficiency at part load/half load, by considering the frictional losses to be same.	(03)
1B.	Sketch and explain the construction and working of stratified engines.	(05)
1C.	Sketch the 4-stroke valve timing diagram for low speed engine.	(02)
2A.	Explain the dynamic factors which influence the valve timing of a 4-stroke engine.	(05)
2B.	Draw the actual cycle indicator diagram for 4 stroke S.I engine.	(02)
2C.	Discuss the phases of exhaust stroke.	(03)
3A.	Explain the main metering system of a complete carburetor.	(02)
3B.	A petrol engine consumes 7.5kg of petrol per hour. The specific gravity of the fuel is 0.75, air temperature is 25° C, air fuel ratio is 15. The choke tube has a diameter of 22mm.calculate the diameter of the fuel jet of a simple carburetor. Top of the jet is 4mm above the petrol level in the float chamber. Take coefficient of discharge as 0.82 and 0.7 for air and fuel respectively. Consider Atmospheric pressure = 1.013 bar.	(03)
3C.	Mention the transient condition mixture requirements for a carburetor and explain the working of elementary carburetor with diagram.	(05)
4A.	Discuss the method of solid injection system.	(02)
4B.	Sketch and explain the working of Inline type fuel injection pump.	(03)
4C.	A S.I engine has a fuel air ratio of 0.07:1. Find how many kilograms of air per hour are required for an output of 75kW at an overall efficiency of 20%. How many m3 of air are required per hour if the density of air is 1.2kg/m3? If the fuel vapour has a density four times that of air, how many m3 per hour of the	(05)

mixture is required? The calorific value of the fuel is 43700 kJ/kg.

MAX. MARKS: 50

5A.	Differentiate air cooling to liquid cooling.	(03)
5B.	Sketch the different layouts of supercharging and explain any one.	(03)
5C.	Sketch and explain semi pressurized wet sump lubrication system.	(04)