Sanjay Ghodawat University, Kolhapur

2020-21

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EXM/P/09/00

Year and Program: Final year B.Tech	**School of Technology**	**Department: Aeronautical engineering**
Course Code: AET 409A	**Course Title: Rocket Propulsion**	**Semester :VII**
Day : Tuesday **Date: 29.12.2020**	**End Semester Examination**	**Time:2 Hrs.** **Max Marks:50**

Instructions: 1) All Questions are compulsory.
2)Assume suitable data wherever necessary.

		Marks	Bloom's Level	CO
Q.1	**Answer the following (any Two)**–			
a)	The following measurements were made in a sea level test of a solid propellant rocket motors: Burn duration: 40Sec Initial mass before test:1210 Kg Mass of rocket motor after test :215 Kg Average Thrust : 62250 N Chamber pressure:7 Mpa Nozzle exit pressure :0.070 Mpa Nozzle throat diameter:0.0855m Nozzle exit diameter :0.2703m Determine massflow rate,v_2,c*,c and $I_s$at the sea level. Assume an invariant thrust and mass flow rate and negligible short start and stop transients.	8	L_4	CO1
b)	A rocket powered by a liquid propellant rocket motor has the following data : Thrust force of 450 kN at sea level Propellant consumption rate=150 kg/Sec Gas exit static pressure=70 Kpa Exhaust area=0.5 m^2 If the exhaust speed kept constant calculate the effective exhaust speeds and thrust force in the following cases (i) Sea level operation(Pa= 101.0 kPa) (ii) In space operation (Pa= 0.0 kPa)	8	L_4	CO1
c)	Analyze the Isentropic flow through the nozzle over a rocket engine	8	L_4	CO2

Q.2 Answer the following (any two) –

a)	Explain the rocket engine power cycles in Cryogenic propulsion system.	8	L_2	CO3
b)	List down the factor influencing the injector behavior.	8	L_2	CO3
c)	Illustrate the propellant characteristics of solid propulsion	8	L_2	CO3

Q.3 Answer the following (any two) –

a)	Distinguish between the advantages of Hybrid engines with liquid rockets.	9	L_4	CO4
b)	Write notes on nuclear rocket and justify the reason for nuclear thermal propulsion in space.	9	L_4	CO5
c)	Assume you a propulsion engineer compare the different electrical propulsion system.	9	L_4	CO5

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