Hall Ticket Number :										

R-17

Code: 7G561

III B.Tech. II Semester Supplementary Examinations February 2021

Applied Thermodynamics-III

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Explain briefly the methods employed for the improvement of thermal efficiency of an open cycle gas turbine plant.	6M	1	II
	b)	In a simple gas turbine plant, air enters at 1 bar and 20^0C and compressed with isentropic efficiency of 80% to 4bar. Then it is heated in combustion chamber with A:F ratio=90:1. The Calorific value of a fuel used is 41.8 MJ/kg. If air flow is 3kg/sec, estimate the power developed and thermal efficiency by the plant. Take C_p= 1kJ/kg ^{0}C and Y=1.4 for air as well as gas.	8M	1	VI
		OR			
2.	a)	With the aid of a neat sketch, explain liquid propellant Rocket system?	7M	1	II
	b)	A turbo jet engine consumes air at the rate of 60.2 kg/s when flying at a speed of 1000 km/hr. Estimate: (i) Fuel flow rate in kg/s, when air fuel ratio is 70:1 (ii) propulsive power, and (iii) propulsive efficiency.	7M	1	VI
		UNIT–II			
3.	a)	Draw the schematic of a boot-strap cycle of air refrigeration system, and show the cycle on T-s diagram.	4M	2	I
	b)	A dense air refrigeration machine operating on Bell-Coleman cycle works between 3.4 bar and 17 bar. The temperature of air after the cooler is 15^{o}C and after refrigeration is 6^{o}C, for a refrigeration capacity of 6 tons. Estimate: i) Temperature after compression and expansion ii) Air circulation required in cycle per minute iii) Work of compression and expansion iv) Theoretical COP v) Rate of water circulation required in the cooler in kg/min, if rate of temperature rise is limited to 30^{o}C.	10M	2	VI
		OR			
4.	a)	Explain the effect of evaporator pressure and condenser pressure on the performance of vapor compression refrigeration system using P-h diagram.	6M	2	II
	b)	A cold storage plant is required to store 20 tonnes of fish. The fish is supplied at a temperature of 30°C. The specific heat of fish above freezing point is 2.93 kJ/kg K. The specific heat of fish below freezing point is 7.26 kJ/kg K. The fish is stored in cold storage which is maintained at -8^{0}C. The freezing point of fish is -4^{0}C. The latent heat offish is 235 kJ/kg. If the plant requires 75 kW to drive it, Estimate: i) The capacity of the plant, and ii) Time taken to achieve cooling. Assume actual C.O.P. of the plant as 0.3 of the Carnot C.O.P.	8M	2	VI

UNIT–III

5.	a)	What are desirable characteristics of ideal refrigerant? Explain how refrigerants are designated.	6M	3	II
	b)	Describe with neat sketch Li-Br and water vapour absorption refrigeration system. What are its limitations?	8M	3	I
		OR			
6.	a)	Explain Ozone depleting potential and global warming potential.	6M	3	II
	b)	Explain with neat sketch the working of Electrolux Refrigerator. Also explain significance of Hydrogen used in the system.	8M	3	II

UNIT–IV

7.	a)	Define Air-conditioning. Classify air-conditioning systems.	4M	4	I
	b)	Following data is available for an air conditioning system comprising of filter, cooling coil, fan and distribution system using only fresh air for the purpose of maintaining comfort conditions in summer. RSH = 11.63 kW, RLH = 2.33 kW. Outside design condition: 28°C DBT, 20°C WBT. Inside design condition: 21°C DBT, 50% RH. Temperature of air entering the room = 11°C. Estimate: i) RSHF ii) Coil bypass factor iii) Rate of flow of air kg/hr. iv) Load on cooling coil v) Coil ADP.	10M	4	VI
		OR			
8.	a)	State and explain various heat loads to be considered for cooling load calculations of a typical building.	6M	4	II
	b)	A small office hall of 25 persons capacity is provided with summer air conditioning system with the following data: Outside conditions = 34 ^{0}C DBT and 28 ^{0} C WBT, Inside conditions = 24^{0}C DBT and 50 % RH, Volume of air supplied = 0.4m^3 /min/person Sensible heat load in room=125600 kJ/h, Latent heat load in the room = 42000 kJ/h. Estimate the sensible heat factor of the plant.	8M	4	VI

UNIT–V

9.	a)	With the aid of neat sketches, explain the working of any one type of type de- humidifier.	6M	5	II
	b)	List out the various equipment used in Air Conditioning systems and explain their functions.	8M	5	I,II
		OR			
10.	a)	Explain the major functions of grills and registers in air conditioning systems.	6M	5	II
	b)	Explain the use of heat pump for heating and cooling cycle with a neat diagram?	8M	5	II

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Hall Ticket Number :										

R-17

Code: 7G564

III B.Tech. II Semester Supplementary Examinations February 2021

Instrumentation and Control Systems

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	What are functional elements of any measuring system? Construct the block diagram of any one measuring instrument identifying the functional elements.	7M	1	3
	b)	Define the following terms: (i) Speed of response (ii) Measuring lag (iii) Fidelity (iv) dynamic error	7M	1	1
		OR			
2.	a)	Discuss about systematic and random errors and their remedies.	7M	1	5
	b)	Draw the schematic construction of LVDT and explain its working principle. What are its advantages and limitations?	7M	1	5
		UNIT–II			
3.	a)	Out line the procedure of measuring low pressure using Mcleod gauge.	7M	2	2
	b)	What is the principle of working of an electromagnetic flow meter? What are the advantages and limitations?	7M	2	1
		OR			
4.	a)	State the three laws of thermocouples. Interpret their application.	7M	2	5
	b)	What is the principle of radiation pyrometers? Write the classification of pyrometers?	7M	2	1
		UNIT–III			
5.	a)	Explain the use of scales and balances for force measurement.	7M	3	2
	b)	Write notes on strain gauge type torsion meter	7M	3	2
		OR			
6.	a)	What are the quantities involved in measurement of vibrations? What is the difference between vibrometers and accelerometers?	7M	3	1
	b)	Write short notes on seismic transducers.	7M	3	2
		UNIT–IV			
7.	a)	Write notes on the following related to strain gauges. (i) Gauge materials (ii) carriers (iii) Mounting	7M	5	2
	b)	Discuss about i. Null & deflection modes ii. Quarter, half and full bridge circuits	7M	5	5
		OR			
8.	a)	Write notes on strain gauge circuits.	7M	5	2
	b)	What are the methods of temperature compensation in strain gauge usage?	7M	5	1
		UNIT–V			
9.	a)	What are automatic control systems? Write examples. What are its advantages?	7M	5	1
	b)	Write about signal flow graph algebra.	7M	5	1
		OR			
10.	a)	What are signal flow graphs? What are the terms associated with them?	7M	5	1
	b)	Write notes on hydraulic control systems.	7M	5	1

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Hall Ticket Number :										

R-17

Code: 7GA61

III B.Tech. II Semester Supplementary Examinations February 2021

Managerial Economics and Financial Analysis

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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		Marks	CO	Blooms Level

UNIT–I

1. What is Managerial Economics? Briefly explain the Scope of Managerial Economics? 14M

OR

2. What do you understand by demand forecasting? Explain different methods of demand forecasting? 14M

UNIT–II

3. Explain the following along with examples:
   a) Opportunity Cost and Sunk Cost b) Variable and Fixed Costs
   c) Explicit and Implicit Costs d) Direct and Indirect costs 14M

OR

4. Calculate Break Even Units from the following:
   Variable Cost per unit Rs.20, Selling Price per unit Rs.40 and Fixed cost Rs.10000. 14M

UNIT–III

5. Explain how the price is determined in case of perfect competition. Illustrate. 14M

OR

6. Define the term joint stock company. List out the characteristics of a company? 14M

UNIT–IV

7. What is capital budgeting? Briefly explain the different methods of Capital Budgeting? 14M

OR

8. A project needs an investment of Rs.1,38,500. The cost of the capital is 12%. The net cash inflows are as follows.

Year	1	2	3	4	5
CFAT	30000	40000	60000	30000	20000

   Calculate NPV at 12% and also state whether you recommend or not recommend the proposal.. 14M

UNIT–V

9. Define Ratio Analysis? Discuss its advantages and limitations? 14M

OR

10. From the following prepare Trading and profit & loss account of Sri Charan for the period ending 31st Dec 2019.

Bad Debits	Rs.125
Opening Stock	Rs. 3460
Purchases	Rs.5475
Sales	Rs.15450
Sales Returns	Rs.200
Purchase returns	Rs.125
Postage & Stationary	Rs.875
Advertising	Rs.450
Interest (Debit)	Rs.118
Commission (Credit)	Rs.1250
Taxes and Insurance	Rs.1250
General expenses	Rs.782
Salaries	Rs.3300
Closing stock	Rs.3250

14M

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