Hall Ticket Number :										

R-14

Code: 4G564

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^oC and after refrigeration is 6^oC, 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^oC.	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 -8^0C. The freezing point of fish is -4^0C. 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-14

Code: 4G562

III B.Tech. II Semester Supplementary Examinations February 2021

CAD/CAM

(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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UNIT–I

1. a) Define CAD. Explain the applications of computers in design process.
   b) Write a note on the output devices used in CAD system.

2. a) Describe the various database models which are generally used.
   b) Perform a 45^0 of rotation of a triangle A(0,0), B(1,1), C(5,2) about the origin.

UNIT–II

3. Describe briefly the following methods of surface modeling with a few application examples:
   i. Revsurf
   ii. Tabcyl
   iii. Bicubic surface
   iv. Bezier surface

OR

4. What is geometric modeling? Explain its importance in CAD / CAM applications. Discuss the different types of geometric modeling techniques.

UNIT–III

5. a) What do you understand by the term Numerical Control? Explain briefly the functions that are expected to be served by NC in machine tools.
   b) Discuss the advantages and limitations of open loop and closed loop controls.

OR

6. a) Explain the APT statements:
   i) GOTO and GO/TO ii) GODLTA and GOBACK and iii) INTOL and OUTTOL.
   b) With a neat sketch explain the Structure of CNC machine tools

UNIT–IV

7. a) What are part families? What are the methods used for grouping of parts?
   b) Explain the part design and manufacturing attributes giving examples.

OR

8. Explain the following:
   (a) FMS data files and reports,
   (b) FMS Applications.

UNIT–V

9. a) Discuss the important benefits of computer-aided quality control. 7M
   b) Describe the features of a flexible inspection system. 7M

OR

10. a) Explain the method of part inspection using a CMM. 7M
    b) What are the different material handling systems used in industry? Discuss in details. 7M

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Hall Ticket Number :										

R-14

Code: 4G561

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-14

Code: 4G563

III B.Tech. II Semester Supplementary Examinations February 2021

Metrology and Surface Engineering

(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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UNIT–I

1. Explain the difference between interchangeable and selective assembly. For what type of application is selective assembly used? 14M

OR

2. Explain Taylor's Principle of Gauge Design with suitable example? 14M

UNIT–II

3. Distinguish between Line standards and End standards. Give examples of these two types of standards. 14M

OR

4. How we are measuring angles using universal bevel vernier protractor With a neat sketch. 14M

UNIT–III

5. What do you mean by waviness and roughness? Describe the methods for numerical assessment of surface texture. 14M

OR

6. a) Explain working, construction of any one mechanical comparator and what are it's limitations? 14M

UNIT–IV

7. Define best wire size. Explain the measurement of effective diameter of screw thread using three wire method. 14M

OR

8. Describe with sketches the applications of CMMs taking an example of work piece. 14M

UNIT–V

9. List out various diffusion coating process and explain them in detail. 14M

OR

10. a) State the importance of Surface treatment processes and their characteristics and applications. 6M

    b) Describe different types of Diffusion coatings 8M

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