AR18

CODE: 18CET317 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

BASIC DESIGN OF STEEL STRUCTURES

(Civil Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. A single bolted double cover butt joint is used to connect two plates of 8mm thick. Provide 16mm diameter bolts of grade 4.6 with two cover plate of 6mm thick. Assume pitch 45mm and edge distance 30mm. Calculate strength and efficiency of the joint. 12M

(OR)

2. A tie member of a roof truss consists of 2 ISA 100 X 75 X 8 mm. The angles are connected to either side of a 10 mm gusset plates and the member is subjected to a working pull of 300 kN. Design the welded connection. Assume connections are made in the workshop. 12M

UNIT-II

3. Design a simply supported beam of effective span 1.5 m carrying a factored concentrated load of 360 kN at mid span. 12M

(OR)

4. A simply supported beam of span 5 m supports laterally supported. The loads supported by the beam comprise of an uniformly distributed service live load of 20 kN/m and the dead load due to the floor slab and other fittings of 20 kN/m. Adopting Fe 410 grade steel, design the simply supported steel beam according to IS: 800: 2007. 12M

UNIT-III

5. Design a single angle section for a tension member of a roof truss to carry a factored tensile force of 225 kN. The member is subjected to the possible reversal of stress due to the action of wind. The effective length of the member is 3m. Use 20 mm shop bolts of grade 4.6 for the connection. 12M

(OR)

6. Design a laced column with two channels back to back of length 10 m to carry an axial factored load of 1400 kN. The column may be assumed to have restrained in position but not in direction at both ends (hinged ends). 12M

UNIT-IV

7. Design a crane gantry girder to carry an electric overhead travelling crane for an industrial building to suit the following data: 12M
Crane load lifting capacity: 200 kN
Weight of crane girder excluding trolley: 200 kN
Weight of trolley, motor, hook etc: 40 kN
Distance between centres of gantry rails: 15m
Minimum approach of crane hook: 1.2 m
Distance between centres of crane wheels: 3.5 m
Span of gantry girder: 7.5 m
Weight of rail section: 0.3 kN/m
Height of rail section: 150 mm
Yield stress of steel: 250 MPa.

(OR)

8. Design a simply supported crane gantry girder to support an overhead travelling crane using the following data: 12M
Crane load lifting capacity: 300 kN
Weight of crane and crab: 250 kN
Distance between centres of gantry rails: 15m
Minimum approach of crane hook: 1.2 m
Distance between centres of crane wheels: 3.5 m
Span of gantry girder: 5 m
Weight of rail section: 0.3 kN/m
Height of rail section: 75 mm
Yield stress of steel: 250 MPa.

UNIT-V

9. a) Explain the following procedure for designing plate girders with neat sketches: 6M
(i) Simple post critical method (ii) Tension field method
b) Write a short note on the following: 6M
(i) Types of stiffeners (ii) End panel design (iii) Design of bearing stiffeners

(OR)

10. Design a welded plate girder of span 24 m to carry superimposed load of 35 kN/m. Avoid use of bearing and intermediate stiffeners. Use Fe 415. 12M

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AR18

CODE: 18EEE321 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

PRINCIPLES OF SIGNALS AND SYSTEMS

(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Sketch the following signals: 6M
   i) x(t)= u(t)-2u(t-1)+u(t-2)
   ii) x(t)= u(t+2)-u(t-2)
   iii) x(t)= r(t)-r(t-1)-r(t-3)+r(t-4)

   b) Identify the following systems whether time invariant, linear, and causal systems: 6M
   i) y(t)= $\int_{-\infty}^{2t} x(\tau)\, d\tau$
   ii) y(t)= $\frac{d}{dt}$ x(t)

(OR)

2. a) Check whether the following signals are periodic, causal and energy 6M
   i) $x(t) = 2\cos\left(\frac{\pi}{4}t\right) + \sin\left(\frac{\pi}{8}t\right)$ ii) $x(n) = \sum_{k=-\infty}^{\infty}[\delta(n-4k) - \delta(n-1-4k)]$

   b) Describe the properties of Systems. 6M

UNIT-II

3. a) Find the convolution of the following signals 6M
   $x_1(t) = e^{-at}u(t),\ x_2(t) = te^{-bt}u(t)$

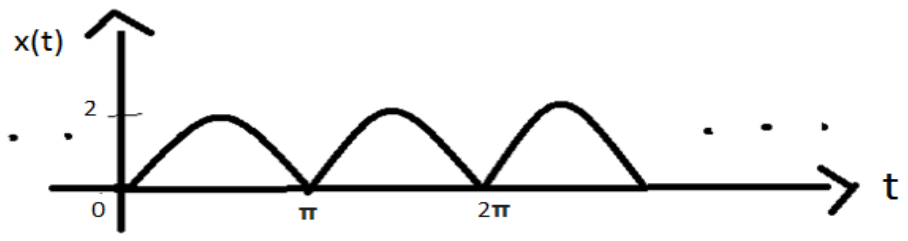
   b) Identify whether the following systems are LTI systems or not? 6M
   i) $y(t) = x(4 - \frac{t}{2})$ ii) $\frac{dy(t)}{dt} + 2y(t) = x(t) + 2$

(OR)

4. a) The input x[n] and the impulse response h[n] of a discrete-time LTI system are given by:x[n]= u[n], h[n]= α^n u[n], 0<α<1. Find the ouput of the system y[n]. 6M
   b) Let y[n] = x[n]* h[n]. Then show that $x[n - n_1] * h[n - n_2] = y[n - n_1 - n_2]$. 6M

UNIT-III

5. a) Find the exponential fourier series of the half wave rectified output: 6M



b) Discuss the following properties of fourier transform: 6M
   i) Convolution in time domain
   ii) Duality property

(OR)

6. a) Find the Fourier transform of following signals 6M

   i) $x(t) = e^{-3|t|} \sin 2t$ ii) $x(t) = \Delta(\frac{t}{2})$ iii) $x(t) = e^{-at^2}$

   b) Find the inverse Fourier transform of: $X(\omega)=1/(2- \omega^2+j3\omega)$ 6M

UNIT-IV

7. a) Find the laplace transform of: 6M
   $x(t)= e^{-a|t|} u(t)$; a>0 and
   identify its region of convergence
   b) Check whether the following LTI systems are stable and causal 6M

   i) $H(s)= \frac{1}{s^2-s-6}$ if ROC is Re(s)<-2

   ii) $H(s)= \frac{1}{s^2-s-6}$ if ROC is -2< Re(s)<3

(OR)

8. a) Discuss the following properties of laplace transform: 6M
   i) Differentiation in time domain
   ii) Integration in time domain
   b) Find the inverse laplace transform of: 6M

   $x(s)= \frac{-5s-7}{(s+1)(s-1)(s+2)}$ if ROC is -2< Re(s)<-1

UNIT-V

9. a) State and prove time shifting and time convolution properties of z- transform. 6M
   b) Prove that the sequences $x1(n)=a^n u(n)$ and $x2(n)= -a^n u(-n-1)$ have the same X(z) and differ only in ROC's. Plot their ROC's. 6M

(OR)

10. a) Find the inverse z- transform of $X(z)=z/(z+2)(z-3)$ when the ROC is i) ROC: $|z| < 2$ ii) ROC: $2 < |z| < 3$ 6M
    b) Explain the properties of the region of convergence of X (z). 6M

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AR18

CODE: 18MEE311 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

ROBOTICS

(Professional Elective-I)

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. Draw and explain the following types of robot configuration. 12M
(i) Cartesian Robot, (ii) Cylindrical Robot, (iii) Spherical Robot (iv) Articulated Robot

(OR)

2. Discuss the features, capabilities, applications, merits and limitations of Stepper and Servo Motors. 12M

UNIT-II

3. a) Describe the use of homogenous transformation. 6M
b) Derive the homogenous transformation matrix? Explain four sub matrices in detail. 6M

(OR)

4. Consider the two-link planar arm of Figure.1. 12M
(i) Find the DH parameter table containing $a_i\ \alpha_i\ d_i\ \theta_i$.
(ii) Write an equation in terms of A matrices that show how ${}^0T_2$ can be calculated for two-link planar arm of Figure.1.

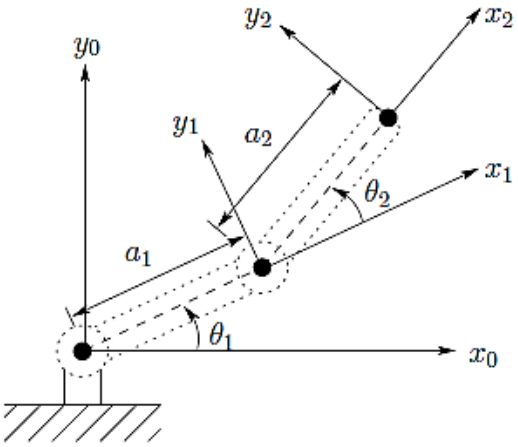

Figure.1: Two-link planar manipulator

UNIT-III

5. It is desired to have the first joint of a 6-axis robot go from an initial angle of 50^0 to a final angle of 80^0 in 3 seconds. Calculate the coefficients for a third-order polynomial joint-space trajectory. Determine the joint angles, velocities, and accelerations at 1, 2, and 3 seconds. It is assumed that the robot starts from rest and stops at its destination. Draw the position, velocity, and acceleration curves for the motion. 12M

(OR)

6. a) Draw and explain the Jacobian forward and inverse differential motion model 6M
   b) Make a comparison of Newton-Euler and Lagrange-Euler formulations and state the situation when you will prefer Newton-Euler and when you will prefer Lagrange Euler formulation. 6M

UNIT-IV

7. a) Explain the operation of optical encoder used in robot as a feedback device. 6M
   b) Explain about Force sensors with neat sketch. 6M

(OR)

8. a) Distinguish between textual programming and lead through programming. 6M
   b) Write VAL commands for controlling end-effector motion of a robot. 6M

UNIT-V

9. Explain the following obstacle avoidance of graph-based approaches. 12M
   (i) Visibility graph (ii) Varonol diagram

(OR)

10. a) Discuss about a robot work cell for machine loading and unloading application with a neat sketch. 6M
    b) Explicate in detail about the design of remote centered devices used for assembly operation. 6M

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AR18

CODE: 18ECE321 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

TELECOMMUNICATION SWITCHING SYSTEMS & NETWORKS

(Professional Elective – II)

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	For a carbon granule Microphone determine a suitable value for m, if the contribution from each of the higher order terms is to be less than $0.01I_0$.	6M
	b)	A three-stage switching structure supports 128 inlets and 128 outlets. It is proposed to use 16 first stage and third stage matrices then what is the number of switching elements in the network if it is non-blocking	6M

(OR)

2.	a)	Briefly explain the evolution of telecommunication networks?	6M
	b)	Explain in detail the elements of switching system	6M

UNIT-II

3.	a)	Compare load sharing and synchronous duplex configuration of the centralized SPC.	6M
	b)	Distinguish between phased and slotted operation of time division time switching	6M

(OR)

4.	a)	Explain about the input-controlled time division space switch and output-controlled time division space switch?	8M
	b)	What is the advantage of Time Switching over Space switching?	4M

UNIT-III

5.	a)	What are the factors that determine the maximum distance between the switching systems and subscriber premises?	6M
	b)	What is the switching hierarchy in telephone networks and how the routing is accomplished?	6M

(OR)

6.	a)	Explain the transmission plan in telephone networks.	6M
	b)	Draw and describe the architecture of SS7 signalling?	6M

UNIT-IV

7.	a)	what is protocol data unit? how encapsulation/decapsulation are occur in layered architecture	6M
	b)	Briefly describe the seven layers of the OSI protocol hierarchy?	6M

(OR)

8.	a)	List and describe the eight primary standards organizations for data communications	6M
	b)	Explain in detail about the TCP/IP protocol model	6M

UNIT-V

9.	a)	What is difference between packet switching networks and value-added networks	6M
	b)	Briefly describe the architecture of ISDN	6M

(OR)

10.	a)	describe the layout for a public switched data network	6M
	b)	Explain the BISDN configuration and broadband channel rates?	6M

AR18

CODE: 18CST315 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

UNIX INTERNALS

(Computer Science and Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	With neat sketch explain about UNIX architecture.	6 M
	b)	Explain the following UNIX utilities with examples i)mkdir ii)sort iii)ls iv) sort	6 M
		(OR)	
2.	a)	Explain the following UNIX utilities with examples i)chmod ii) tail iii) paste iv) tee	6 M
	b)	What is awk? Explain about different built-in functions supported by awk.	6 M

UNIT-II

3.	a)	What is meta character? Explain about shell meta characters.	6 M
	b)	Write a shell script to check whether a given number is prime or not.	6 M
		(OR)	
4.	a)	Describe in detail about loop control structures supported by shell.	6 M
	b)	Write a shell program for finding reverse of a given number.	6 M

UNIT-III

5.	a)	Define system call. Explain about different Directory handling system calls.	6 M
	b)	Explain the role of i) link() ii) symlink() iii) getcwd().	6 M
		(OR)	
6.	a)	Explain the following system calls i)write() ii) lseek() iii) stat()	6 M
	b)	Differentiate the following i)dup() vs dup2() ii) gets() vs fgets()	6 M

UNIT-IV

7.	a)	Define process. Explain the following system calls with examples i)fork() ii) exec() iii) raise()	6 M
	b)	Describe in detail about zombie process.	6 M
		(OR)	
8.	a)	Define signal. Explain various signal handling functions.	6 M
	b)	Explain about the following i)alarm() ii) signal() kill()	6 M

UNIT-V

9.		Explain the various IPC mechanisms.	12 M
		(OR)	
10.	a)	Define semaphore. Demonstrate semaphore with example program.	6 M
	b)	What is a pipe? Explain about different types of pipes.	6 M

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AR18

CODE: 18ITT301 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

INTERNET OF THINGS

(Information Technology)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Define IoT and explain any 4 characteristics of IoT.	6M
	b)	Discuss about publish-subscribe communication model of IoT with a neat sketch.	6M
		(OR)	
2.	a)	Draw the generic block diagram of an IoT device and explain each block.	6M
	b)	Discuss the role of wearable electronics in applications of IoT for health.	6M

UNIT-II

3.	a)	Elaborate on NETCONF protocol layers.	6M
	b)	Distinguish between IoT and M2M.	6M
		(OR)	
4.	a)	Explain any six network operator requirements.	6M
	b)	Illustrate the importance of NFV in IoT with a neat architecture.	6M

UNIT-III

5.	a)	Discuss on functional view specification in IoT design methodology.	6M
	b)	Why python is preferred as a language for IOT devices.	6M
		(OR)	
6.	a)	Sketch and explain briefly the steps involved in IoT system design methodology.	6M
	b)	Discuss about any one control flow statement in python with an example.	6M

UNIT-IV

7.	a)	Enumerate Raspberry Pi interfaces.	6M
	b)	Discuss about Amazon EC2 Web service.	6M
		(OR)	
8.	a)	Discuss about pc Duino, Beagle bone black, cubie boards.	6M
	b)	Elaborate on WAMP session between client and router.	6M

UNIT-V

9.	a)	What is REST? What are the steps in designing REST services.	6M
	b)	Elaborate on components of Hadoop cluster.	6M
		(OR)	
10.	a)	Explain the process specification for smart parking IoT system with a neat sketch.	6M
	b)	Illustrate the key components of Hadoop YARN.	6M

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AR16

CODE: 16CE3016 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

DESIGN AND DRAWING OF STEEL STRUCTURES

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

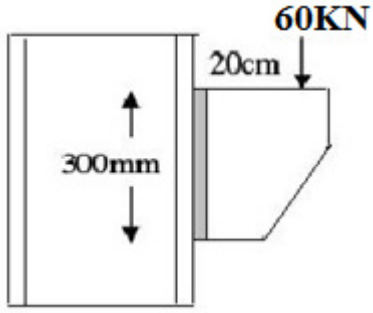
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. A single bolted double cover butt joint is used to connect two plates of 10mm thick. Provide 20mm diameter bolts of grade 4.6 with two cover plate of 10mm thick. Assume pitch 50mm and edge distance 30mm. Calculate strength and efficiency of the joint. 14M

(OR)

2. Determine the depth of the fillet weld required to join a plate bracket with flange of a stanchion as shown in figure (Load = 60 kN) 14M



UNIT-II

3. Design a beam of effective span 8.0m and subjected to a bending moment of $110.8x10^6$Nmm. The compression flange is laterally unsupported throughout. Check for deflections and shear. Assume fy =250MPa 14M

(OR)

4. A simply supported beam of span 5 m supports laterally supported. The loads supported by the beam comprise of an uniformly distributed load of 20 kN/m. Adopting Fe 410 grade steel, design the simply supported steel beam according to IS: 800: 2007. 14M

UNIT-III

5. Design a tension member to carry a load of 300 kN. The two angles placed back to back with long legs out standing are desirable. The length of the member is 3.5m. Design a simply supported beam of span 6 m and it has to carries a factored UDL of 35. 14M

(OR)

6. a) Write the different types of compression members 5M
   b) A column section ISHB 300@ 0.630kN/m is carrying an axial load of 1000kN. It is to be supported over a column section ISHB 400 @ 0.822kN/m. Design the column splicing. 9M

UNIT-IV

7.	Explain the design procedure of gantry girders.	14M
	(OR)	
8.	A hand operated 50**kN**overhead crane is provided in a workshop. The details are given below: Centre to centre between gantry girders = 16 m, Span of the gantry girder = 5 m, Weight of the crane = 40**kN,** Wheel spacing = 3 m, Weight of the crab = 10 **kN,** Maximum edge distance = 1 m, Design a simply supported gantry girder, assuming the flange is laterally supported.	14M

UNIT-V

9.	Design a welded plate girder to carry a superimposed load of 15 tonnes per metre on an effective span of 28 metres. Assume necessary data.	14M
	(OR)	
10.	Design an 14m long simply supported welded plate girder carrying a uniformly distributed load of 40kN/m including self-weight. Assume that girder is laterally supported throughout.	14M

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AR16

CODE: 16EC3024 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

TELECOMMUNICATION SWITCHING SYSTEMS

(Elective –I)

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Briefly explain the evolution of telecommunication networks?	7M
	b)	Discuss the various elements of switching system?	7M
		(OR)	
2.	a)	Explain the principles of cross bar switching.	7M
	b)	Classify different types of switching systems?	7M

UNIT-II

3.		Explain different modes used in dual processor architecture configurations in centralized stored program control (SPC).	14M
		(OR)	
4.	a)	Explain basic time division switching.	7M
	b)	Calculate the number of trunks that can be supported on a time multiplexed space switch, given that i) 32 channels are multiplexed in each stream ii) Control memory access time is 100ns. Bus switching and transfer time is 100ns per transfer.	7M

UNIT-III

5.	a)	Write short notes on grade of service and blocking probability.	7M
	b)	Explain about charging plans.	7M
		(OR)	
6.	a)	What is channel signalling technique? What are the advantages and limitations of channel signalling technique?	7M
	b)	Explain the transmission plan in telephone networks.	7M

UNIT-IV

7.		Describe the following transmission modes: simplex, half duplex, full duplex and full/full duplex?	14M
		(OR)	
8.	a)	Define and describe data communication arrangements?	7M
	b)	Describe data communication protocols?	7M

UNIT-V

9.		Explain the architecture of ISDN and list various services provided by ISDN?	14M
		(OR)	
10.	a)	Write briefly about broadband ISDN?	7M
	b)	Contrast the differences between circuit switching and packet switching?	7M

AR16

CODE: 16CS3019 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

ARTIFICIAL INTELLIGENCE

(Common to CSE & IT)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	What is a control strategy? Discuss the desirable properties of a good control strategy.	7 M
	b)	Discuss the characteristics of various types of problems.	7 M
		(OR)	
2.	a)	Explain hill climbing algorithm.	9 M
	b)	Write short notes on problem graphs.	5 M

UNIT-II

3.	a)	Illustrate the steps of minimax algorithm using an appropriate example.	7 M
	b)	Discuss the issues of knowledge representation.	7 M
		(OR)	
4.		Consider the following sentences: i. John likes all kinds of food. ii. Apples are food iii. Chicken is food iv. Anything anyone eat and isn't killed by is food. v. Bill eats peanuts and is still alive. vi. Sue eats everything Bill eats Prove that John likes peanuts using Resolution.	14 M

UNIT-III

5.	a)	What is a frame based system? Explain.	7 M
	b)	Discuss forward Vs. backward chaining.	7 M
		(OR)	
6.	a)	Explain Dempster - Shafer theory.	7 M
	b)	Describe the role of certainty factors in knowledge inference.	7 M

UNIT-IV

7.	a)	Describe K STRIPS plan generation system.	7 M
	b)	With the aid of suitable example, illustrate goal stack planning.	7 M
		(OR)	
8.	a)	What is machine learning? Describe any two applications of machine learning.	7 M
	b)	Illustrate STRIPS style planning for blocks world problem.	7 M

UNIT-V

9.	a)	Describe the features of MYCIN.	7 M
	b)	Explain how to represent domain knowledge for an expert system.	7 M
		(OR)	
10.	a)	Discuss the role of explanation in expert systems.	7 M
	b)	Explain in detail about knowledge acquisition in expert systems.	7 M

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AR13

CODE: 13ME3020 SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

HEAT TRANSFER

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define overall heat transfer co-efficient.
   b) State Newton's law of cooling or convection law.
   c) Define fins. State the applications of fins.
   d) What is lumped systems analysis?
   e) What is critical radius of insulation?
   f) Define boundary layer thickness.
   g) Write the unit of heat transfer coefficient.
   h) What is nucleate boiling?
   i) What is Stefan Boltzmann Law?
   j) What is the use of radiation shield?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Derive Fourier's Law of equation for heat transfer by conduction. State some essential features of the Law. [6M]
   b) An exterior wall of a house may be approximated by a 0.1m layer of common brick (k = 0.7W/mºC) followed by a 0.04m layer of gypsum plaster (k = 0.48W/mºC). What thickness of loosely packed rock wool insulation (k = 0.065W/mºC) should be added to reduce the heat loss or (gain) through the wall by 80%? [6M]

(OR)

3. a) Derive the general heat conduction equation for Cartesian coordinates. [6M]
   b) The door of a cold storage Plant is made from two 6 mm thick glass sheets separated by a uniform air gap of 2mm. The temperature of the air inside the room is -20ºC and the ambient air temperature is 30ºC. Assuming the heat transfer coefficient between glass and air to be 23.26 W/m^2K, determine the rate of the heat leaking into the room per unit area of the door. Neglect convection effects in the air gap. Kglass = 0.75 W/mK; Kair = 0.02 W/mK [6M]

UNIT-II

4. a) Briefly explain the applications of extended surfaces. [6M]
   b) Explain the Efficiency of fin and effectiveness of fin. [6M]

(OR)

5. a) An egg with mean diameter of 40 mm and initially at 20ºC is placed in a boiling water pan for 4 minutes and found to be boiled to the consumer's taste. For how long should similar egg for same consumer be boilded when taken form a refrigerator at 5ºC. take the following properties for egg:
   K = 10 W/mºC, ρ = 1200 kg/m^3, c = 2kJ/kg ºC, and h= 100 W/m^2 ºC. Use Lump theory. [6M]
   b) A longitudinal copper fin (k=3.5 W/m-K), 6 cm long and 5 mm in diameter is exposed to air stream at a temperature of 20ºC. The connective heat transfer coefficient is 20 w/m^2-K. If the fin has the base temperature of 150 ºC, calculate (i) the heat transfer by the fin (ii) The fin efficiency. [6M]

AR13

CODE: 13ME3020 SET-2

UNIT-III

6. a) Describe the Rayleigh's method for dimensional analysis. [6M]
   b) A vertical cylinder 1.5 m high and 180 mm in diameter is maintained at 100ºC in an atmosphere environment of 20ºC. Calculate heat loss by free convection from the surface of the cylinder. Assume properties of air at mean temperature as, ρ = 1.06 kg/m^3, ν = 18.97 x 10-6 m^2/s, cp = 1.004 kJ/kgºC and k = 0.1042 kJ/mhºC. [6M]

(OR)

7. a) Explain the significance of non dimensional numbers in brief. [6M]
   b) Air at 15ºC and at a pressure of 3 atmospheres is flowing along a flat plate at a velocity of 5 km/sec. If the plate is one meter wide and at a temperature of 70 ºC, find the quantities given below at x= 0.5 m. [6M]
   (i) Hydrodynamic Boundary layer thickness. (ii) Local friction factor
   (iii) Average friction (iv) Local heat transfer co-efficient

UNIT-IV

8. a) Define Logarithmic Mean Temperature Difference (LMTD) and state the assumptions that are made in order to derive expression for LMTD for various types of heat exchangers. [6M]
   b) In an industry 0.6 kg/Sec of oil (Cp = 5.0 kJ/kg-K) is to be cooled in a counter flow heat exchanger from a temperature of 200ºC to a temperature of 50ºC by the use of water entering at 20ºC. The overall heat transfer coefficient is 500 W/m^2-K. Presuming the exit water temperature should not exceeds 80 ºC, using NTU method, Calculate: (i) Water flow rate (ii) surface area required [6M]

(OR)

9. a) Derive an expression for effectiveness by NTU method for the parallel flow heat exchangers. [6M]
   b) Water (cpc = 4200 J/kg ºC) enters counter-flow double pipe heat exchanger at 38ºC flowing at 0.076 kg/s. It is heated by oil (cp = 1880 J/kg ºC) flowing at the rate of 0.512 kg/s from an inlet temperature of 116ºC. For an area of 1 m2 and U = 340 W/m^2 ºC, determine the total heat transfer rate. [6M]

UNIT-V

10. a) State and explain Kirchhoff's identity. What are the conditions under which it is applicable [6M]
    b) Two large parallel plates having emissivity of 0.5 and 0.6 are maintained at 1000 K and500 K respectively. A radiation shield having an emissivity of 0.03 on both sides is placed between the plates. Calculate: [6M]
    (i) Heat transfer per unit area without shield. (ii) Find out the temperature of the shield and heat transfer per unit area with shield.

(OR)

11. a) Derive an expression for the shape factor in case of radiation exchange between two surfaces. [6M]
    b) The effective temperature of a body having an area of 0.12 m^2 is 527ºC. Calculate the following: [6M]
    (i) The total rate of energy emission,
    (ii) The intensity of normal radiation, and
    (iii) The wavelength of maximum monochromatic emissive power.

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AR13

CODE: 13CS3018 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, January-2022

COMPUTER GRAPHICS

(Computer Science & Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define computer graphics
   b) List any two applications of graphics
   c) What is DDA algorithm
   d) What is transformation
   e) What is translation
   f) What is windowing
   g) Define projection
   h) State application of parallel projection
   i) What is Back face
   j) What is scan line algorithm

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. Explain point, line and plane representation **(12M)**

(OR)

3. a) Explain pixel and frame buffers **(6M)**
   b) Discuss types of display devices **(6M)**

UNIT-II

4. a) Explain Bresenham's line algorithms **(6M)**
   b) Discuss midpoint algorithm for circle generation **(6M)**

(OR)

5. a) Explain algorithm for polygon generation **(6M)**
   b) Explain simple DDA **(6M)**

UNIT-III

6. a) Explain scaling and rotation transformations. **(6M)**
   b) Discuss various clipping operations **(6M)**

(OR)

7. a) Explain Sutherland Hodgeman algorithm **(6M)**
   b) Explain Cohen Sutherland line clipping algorithm **(6M)**

UNIT-IV

8. a) Discuss 3D translation and scaling transformations. **(6M)**
   b) Explain B spline curves. **(6M)**

(OR)

9. a) Write a notes on Beziere curve **(6M)**
   b) Explain perspective transformation **(6M)**

UNIT-V

10. Explain Z buffer and warnock's algorithm **(12M)**

(OR)

11. a) Discuss various sequence of steps in animation. **(6M)**
    b) Explain key frame systems. **(6M)**