AR16

CODE: 16CE3019 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2019

PRE-STRESSED CONCRETE

(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)	What is Pre-stressing and explain different types of Prestressing	2M
	b)	Discuss why high grade concrete and high strength steel are basic requirements for a PSC member	12M
		(OR)	
2.	a)	What is pre tensioning and post tensioning	2M
	b)	Illustrate Importance of Freyssinett system of post tensioning.Explain with sketches Freyssinett system of post tensioning?	12M

UNIT-II

3.	a)	What are the different types of losses of prestress.	2M
	b)	A pre tensioned beam 400 mm wide and 600 mm deep is pre stressed by 12 wires each of 10 mm diameter initially stressed to 1200 N/mm^2 with their Centroids located 100 mm from the soffit. Estimate the final percentage loss of stress due to elastic deformation, creep, shrinkage and relaxation using the following data: Relaxation of steel stress = 90 N/mm^2 Es =210 kN/mm^2 EC = 35 kN/mm^2 Creep coefficient = 1.5 Residual shrinkage strain = 2 x 10^-4	12M
		(OR)	
4.	a)	List the influencing factors for the shrinkage loss.	4M
	b)	A rectangular concrete beam 100 × 300 mm is prestressed by means of eight 5 mm wires located 65 mm from the bottom and two 5 mm wires located 35 mm From the top of the beam. If the wires are tensioned to a strong of 900 N/mm2 calculate the percentage loss of stress in steel immediately after transfer allowing for the loss of stress due to elastic deformation of concrete only.Given, Es =210 kN/mm^2 and Ec= 31.5 kN/mm^2	10M

UNIT-III

5. a) Discuss the stress distribution in end block. 4M
   b) The end block of prestressed concrete is of size 120mm x 1300mm, an effective pre stressing force of 300 kN is transmitted. The distribution plate is of size 150mm wide and 150mm deep concentrically loaded at the ends. Calculate the maximum tensile force and bursting tension. Use Guyon's method. 10M

(OR)

6. a) Explain Guyon's method for end block design 2M
   b) Define Parameters of End block. Discuss with neat sketch 12M

UNIT-IV

7. A pre cast pre tensioned beam of rectangular section has a breadth of 100 mm and depth of 200mm ,the beam with an effective span of 6m,is prestressed by tendons with their centroid coinciding with the bottom kern. The initial force in the tendon is 200KN. The loss of prestress may be assumed to be 15%.The beam is incorporated in composite T-beam by casting atop flange of breadth 420mm and thickness 40mm,if the composite beam support s a live load of 8Kn/m2,calculate the resultant stresses developed in the precast and in situ cast concrete assuming the pre-tensioned beam: a) unpropped and b) propped during casting of the slab .assume if any necessary data 14M

(OR)

8. Explain the design procedure of composite sections 14M

UNIT-V

9. a) What are the factors affecting long-term deflections? 4M
   b) A rectangular beam 250 × 500 mm in section is simply-supported over a span of 10m. It is prestressed with a parabolic cable which has a maximum eccentricity of 200 mm at midspan and 40 mm at support sections. Effective prestressing force is 1450 kN. Concrete grade is M40. Determine the deflection due to prestress and self weight 10M

(OR)

10. a) Explain the procedure for computing short-term and long-term deflection of PSC beams 7M
    b) A concrete beam having a rectangular section 100 × 300 mm is pre stressed by a parabolic cable with an initial prestressing force of 240 kN. The cable has an eccentricity of 50 mm at the centre and concentric at the supports. If the span of the beam is 10 m and subjected to a live load of 2 kN/m. Calculate the short term deflection at midspan. Assume Ec = 38 kN/mm^2, creep coefficient = 2, loss of prestress = 20%. Estimate the long-term deflection 7M

AR16

CODE: 16EE3019 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2019

PLCS & SCADA THEORY

(Electrical and Electronics 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)	Demonstrate the components used in Industrial Automation	8M
	b)	Justify how automation and control technologies are related to each other with suitable example	6M
		(OR)	
2.	a)	Define vertical industrial automation and demonstrate with suitable real time industrial application	8M
	b)	Describe the need of industrial sensors in automation and explain with examples in real time applications	6M

UNIT-II

3.	a)	Sketch the functional components of a PLC system and explain	7M
	b)	Name the different types of PLC and how they are distinguished each other.	7M
		(OR)	
4.	a)	Give an overview of Programmable logical controller	8M
	b)	Explain how plc is more advantageous in industrial automation	6M

UNIT-III

5.	a)	Represent the symbols of ladder logic input/Outputs and explain their importance in programming with suitable example.	8M
	b)	Express the following equations as a ladder logic program i) Y = (A+B)CD ii) ABC+DE+F	6M
		(OR)	
6.	a)	Demonstrate the different programming languages in Programmable logic controller with suitable examples	7M
	b)	Explain the step by step procedure to create ladder diagram	7M

UNIT-IV

7.	a)	Describe the operation of pneumatic on-delay and off-delay timers	8M
	b)	Write a simple program that will use one timer to flash a light. The light should be on for 1.0 seconds and off for 0.5 seconds. Do not include start or stop buttons.	6M
		(OR)	
8.	a)	Define counter and Name the type of basic counters and its operation using ladder diagram	6M
	b)	Write a ladder logic program that will count the number of parts in a buffer. As parts arrive they activate input *A*. As parts leave they will activate input *B*. If the number of parts is less than 8 then a conveyor motor, output *C,* will be turned on.	8M

UNIT-V

9.	a)	Explain SCADA architecture in detail	8M
	b)	State advantages and disadvantages of SCADA systems	6M
		(OR)	
10.	a)	What is MTU and explain its importance in SCADA systems	7M
	b)	Discuss the importance of SCADA Interfacing	7M

AR16

CODE: 16ME3021 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2019

THERMAL ENGINEERING - II

(Mechanical 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 turbine is supplied with steam at a pressure of 32 bar and a temperature of 410 ^{o}C. The steam then expands isentropically to a pressure of 0.08 bar. Find the dryness fraction at the end of expansion and thermal efficiency of the cycle. If the steam is reheated at 5.5 bar to a temperature of 395 ^{o}C and then expanded isentropically to a pressure of 0.08 bar, what will be the dryness fraction and thermal efficiency of the cycle? 14 M

(OR)

2. Steam is supplied to a turbine at a pressure of 30 bar and a temperature of 400 ^{o}C and is expanded isentropically to a pressure of 0.04 bar. At a stage of turbine where the pressure is 3 bar a connection is made to a surface heater in which the feed water is heated by bled steam to a temperature of 130 ^{o}C. The condensed steam from the feed heater is cooled in a drain cooler to 27 ^{o}C. The feed water passes through the drain cooler before entering the feed heater. The cooled drain water combines with the condensate in the well of the condenser. Assuming no heat losses in the steam, calculate the mass of steam used for feed heating per kg of steam entering the turbine and thermal efficiency of the cycle. 14 M

UNIT-II

3. a) Enumerate the factors which should be considered while selecting a boiler. 8 M
   b) Explain the following boiler terms: 6 M
   Shell, Grate and Refractory.

(OR)

4. a) List the primary requirements of steam generators. 6 M
   b) Explain with neat sketches any two boiler accessories. 8 M

UNIT-III

5. a) A steam turbine develops 184 kW, with a consumption of 16.45 kg/kWh. The pressure and temperature of the steam entering the nozzle are 11.8 bar and 220 ^{o}C. the steam leaves the nozzle at 1.18 bar. The diameter of the nozzle at the throat is 7 mm. find the number of nozzles. If 8% of the total enthalpy drop is lost in friction in diverging part of the nozzle, determine the diameter at the exit of the nozzle and exit velocity of the leaving steam. 7 M
   b) Write a short note on different cooling towers with neat diagram. 7 M

(OR)

6. a) Define critical pressure ratio for the nozzle of the steam turbine. Obtain analytically its value in terms of the index of expansion. 6 M

b) A surface condenser deals with 13625 kg of steam per hour at a pressure of 0.09 bar. The steam enters 0.85 dry and the temperature at the condensate and air extraction pipes is 36 ^{o}C. The air leakage amounts to 7.26 kg/h. Determine (i) the surface required if the average heat transmission rate is 3.97 kJ/cm^2 per second; (ii) the cylinder diameter for the dry air pump, if it is to be single acting at 60 rpm with a stroke to bore ratio of 1.25 and volumetric efficiency of 0.85. 8 M

UNIT-IV

7. a) Explain velocity compounded impulse steam turbine showing pressure and velocity variations along the axis of the turbine. 6 M

b) In a reaction turbine, the fixed blades and moving blades are of the same shape but reversed in direction. The angles of the receiving tips are 35^{o} and of the discharging tips 20^{o}. Find the power developed per pair of blades for a steam consumption of 2.5 kg/s, when the blade speed is 50 m/s. if the heat drop per pair is 10.04 kJ/kg, find the efficiency of the pair. 8 M

(OR)

8. a) The first stage of an impulse turbine is compounded for velocity and has two rings of moving blades and one ring of fixed blades. The nozzle angle is 20^{o} and the leaving angles of the blades are respectively as follows:
First moving 20^{o}, fixed 25^{o} and second moving 30^{o}. velocity of steam leaving the nozzles is 600 m/s and the steam velocity relative to the blade is reduced by 10% during the passage through each ring. Fing the diagram efficiency and power developed for a steam flow of 4 kg/s. blade speed may be taken as 125 m/s. 7 M

b) Derive an expression for blade efficiency of a single stage reaction turbine. 7 M

UNIT-V

9. a) The pressure ratio of an open-cycle gas turbine power plant is 5.6. Air is taken at 30 ^{o}C and 1 bar. The compression is carried out in two stages with perfect intercooling in between. The maximum temperature of the cycle is limited to 700 ^{o}C. Assuming the isentropic efficiency of each compressor stage as 85% and that of turbine as 90%, determine the power developed and efficiency of the power plant, if the air-flow is 1.2 kg/s. The mass of fuel may be neglected, and it may be assumed that c_p = 1.02 kJ/kgK and γ = 1.41. 7 M

b) Explain the working of turbo-jet and turbo-prop engines. 7 M

(OR)

10. A turbo-jet engine travels at 216 m/s in air at 0.78 bar and -7.2 ^{o}C. Air first enters diffuser in which it is brought to rest relative to the unit and it is then compressed in a compressor through a pressure ratio of 5.8 and fed to a turbine at 1110 ^{o}C. The gasses expand through the turbine and then through the nozzle to atmospheric pressure (i.e., 0.78 bar). The efficiencies of diffuser, nozzle and compressor are each 90%. The efficiency of turbine is 80%. Pressure drop in the combustion chamber is 0.168 bar. Determine: 14 M

(i) Air-fuel ratio (ii) Specific thrust of the unit

(iii) Total thrust, if the inlet cross-section of diffuser is 0.12 m^2.

Assume calorific value of fuel as 44150 kJ/kg of fuel.

AR16

CODE: 16EC3022 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2019

COMPUTER ORGANIZATION AND ARCHITECTURE

(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)	Explain various Functional Units in a digital Computer with neat diagram.	7M
	b)	Explain performance equation of the processor in detail.	7M
		(OR)	
2.	a)	Design 4- bit arithmetic circuit to perform all the arithmetic operations and discuss the function table.	8M
	b)	Write short notes on bus and memory transfers.	6M

UNIT-II

3.	a)	Explain about array multipliers.	6M
	b)	Explain division algorithm with the help of flowchart and example.	8M
		(OR)	
4.	a)	Explain binary addition and subtraction using 2's compliment with the help of example.	6M
	b)	Draw the flowchart for Booth's Multiplication Algorithm and explain with an example.	8M

UNIT-III

5.	a)	Discuss about Memory Hierarchy?	6M
	b)	Explain the mapping techniques in cache memory?	8M
		(OR)	
6.	a)	Explain Associative memory.	6M
	b)	Explain the paging concept in virtual memory.	8M

UNIT-IV

7.	a)	Explain Asynchronous data transfer.	6M
	b)	Explain briefly different modes of transfer.	8M
		(OR)	
8.	a)	Differentiate Isolated I/O and Memory Mapped I/O	6M
	b)	Explain in detail about Direct Memory Access.	8M

UNIT-V

9.	a)	Explain data hazards in pipelining.	7M
	b)	Explain about arithmetic pipelining.	7M
		(OR)	
10.	a)	Explain exception handling concept in pipelining.	7M
	b)	Explain basic concepts of micro programmed control.	7M

AR16

CODE: 16CS3019 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2019

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)	Explain the approach of formulation for constraint satisfaction problems with example.	7M
	b)	Define Artificial Intelligence? Discuss various techniques of AI	5M
		(OR)	
2.	a)	What are the advantages of heuristic search? In what kind of a problem space would a depth first search be better than a breadth first one?	7M
	b)	Explain algorithm for steepest hill climbing.	7M

UNIT-II

3.	a)	What is predicate logic? Explain the predicate logic representation with reference to suitable example.	7M
	b)	Explain knowledge representation using frames with suitable example.	7M
		(OR)	
4.	a)	What are the desirable properties of knowledge representation	7M
	b)	Explain Resolution in predicate calculus with suitable example.	7M

UNIT-III

5.	a)	Elaborate on Forward and Backward chaining.	7M
	b)	Explain Bayesian method of reasoning.	7M
		(OR)	
6.	a)	Consider the following sentences: Marcus was a man Marcus was a Pompeian Marcus was born in 40 AD All men are mortal All pompeians died the Volcano erupted in 79 AD No mortal lives for more than 150 years i) Convert them to clause form ii) Answer the question " is Marcus dead now " in two different ways. Clearly state the assumptions made	8M
	b)	What is predicate calculus? Explain in detail about use of predicate calculus with an example.	6M

UNIT-IV

7.	a)	What is machine learning? Explain in detail.	7M
	b)	Describe about basic plan generation systems.	7M
		(OR)	
8.	a)	Illustrate about adaptive learning.	7M
	b)	Write short note on K-Strips.	7M

UNIT-V

9.	a)	Explain in brief about architecture of expert systems?	7M
	b)	List out and explain the characteristics features of expert system.	7M
		(OR)	
10.	a)	Write short note on MYCIN	7M
	b)	Explain the process of knowledge acquisition and validation for expert systems.	7M

AR13

CODE: 13CE3015 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2019

DESIGN OF CONCRETE STRUCTURES –II

(Civil Engineering)

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

PART - A

ANSWER ALL QUESTIONS

Use of I.S 450-2000, I.S 3370-2009 and Sp-16 design tables are allowed. Design must followed by Limit state.

[1 x 10 = 10 M]

1. a) Write the expression to find the minimum depth of foundation for the given soil properties and loading conditions
   b) Neatly sketch and detail the reinforcement of isolated rectangular footing
   c) As per I.S code neatly sketch and show the location of column strip and middle strip in the design of flat slab
   d) Neatly sketch and detail the reinforcement of circular slab with fixed boundary conditions (Plan & Section)
   e) Write the classification of different types of R/C bridges
   f) Write the IRC standards of Class 70R loading
   g) When the IRC class B loading standards used in bridge design
   h) Write the conditions under which the analysis of underground water tank proceed
   i) Neatly sketch and show the limitations of cantilever and continuous frame action in water tank design proceeded
   j) Define Under reamed piles

PART-B

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

UNIT-I

2. a) Design a combined rectangular footing (Slab base) for Two columns A and B each carry axial loads 300kN and 500kN respectively. The column A :300x300mm and column B :450x450mm size , and centre to centre spacing between column 4.5m , and safe bearing capacity of soil 150kN/$m^{2.}$.Design and detail the reinforcement and apply necessary design checks. Use M20 grade concrete and Fe415 grade steel 9
   b) Write the design considerations of isolated footings as per I.S code 3

(OR)

3. a) Design and detail the Circular footing of uniform thickness to receive column load of 800kN. Assume the column size 450mm diameter, and safe bearing capacity of soil 150kN/m^2. Use concrete grade M25 and steel HYSD –Fe415 grade. Design and detail the reinforcement and apply necessary design checks of foundation. 6
   b) Design and detail isolated rectangular footing of uniform thickness to receive column load 600kN. Assume column size 450x600mm, safe bearing capacity of soil 120kN/m^2. Use concrete grade M25 and steel HYSD –Fe415 grade. Design and detail the reinforcement and apply necessary design checks. 6

UNIT-II

4. a) Design a circular roof slab for a circular room of internal diameter 8m carrying imposed load 2kN/$m^{2.}$ Assume the slab is fixed supported at edges and resting on ring beam. Use M20 grade concrete and Fe415 grade steel. Neatly sketch the detailing aspects and apply necessary checks. 6
   b) Design the interior panel of Flat slab of size 5.4mx6.2m . Assume super imposed load 3kN/m^2 on slab and the slab is simply supported on four edges. Provide Two way reinforcement of slab. Design and detail the slab reinforcement. Use M20 grade concrete and Fe415 grade steel 6

(OR)

5. a) Design the internal panel of flat slab for 4x4m room, that carrying 6kn/m^2 live load. Assume all corners supported by columns (size 300x300mm) .Use M20 grade concrete and Fe415 grade steel. Sketch the detailing aspects and necessary checks. 6

   b) A flat slab of 6mx6m is supported on 4 nos of each 300mm diameter circular columns spaced 2mx2m apart in both the directions. The column head has a diameter of 450mm. The live load on the flat slab is 3kN/m^2. Determine the moments in the flat slab in the two directions. Assume storey height as 3.20m. 6

UNIT-III

6. a) A slab panel of a Reinforced concrete T- beam and Slab deck of 3.0m wide is rest on between two main girders c/c spacing 2m and two cross girders spacing at 4m. Design deck slab as per IRC class A loading. Use M_{25} grade concrete and HYSD Fe415 grade steel 9

   b) Classify different types highway loading standards as per IRC in the design of bridges. 3

(OR)

7. a) Design a R/C slab culvert bridge of clear span 4.5m , and length of bridge 6m to carry IRC class B loading standards. Use M25 grade concrete and Fe415 steel 8

   b) Briefly discuss about the design considerations of sub structure components in design of R/C bridges 4

UNIT-IV

8. a) Design a Precast R/C 300mm circular pile for transmitting an axial load of 450kn under service considerations. The pile is to be embedded in hard strata upto depth of 8m. Take embedment length of pile into the foundation as 150mm. Use M_{25} grade concrete and HYSD Fe415 grade steel . Detail the reinforcement with neat sketch. 6

   b) Design a pile cap that carries reaction of each 200kN from group of Three columns arranged in equilateral triangular pattern. Assume column is located centrally in the pile group and the piles are driven into hard strata up to a depth of 12m. Design and detail the pile cap reinforcement with neat sketch. Use M30 grade concrete and Fe415 steel. 6

(OR)

9. A column 450x450mm carries axial load 800kN that supported by Four pile group arranged in rectangular pattern. The piles are driven up to 12m in firm ground. Assume the piles spaced at corners of 4mx4m square grid and column located at centre of pile grid. Use M30 grade concrete and Fe415 steel. Design and detail the piles and pile cap. 12

UNIT-V

10. Design a rectangular underground water tank 10x4x5m (height) with the following data. Density of soil 15kN/m^3 , angle of repose 30^0, live load on top cover slab 3kn/m^2. Use M25 grade concrete and Fe415 steel. Design as per approximate or I.S code method. Neatly sketch and detail the reinforcement with necessary design checks 12

(OR)

11. Design an elevated water tank of capacity 500KL with top circular dome the following data. Assume the shape of tank circular cylinder, and depth of water is 4m. Assume the live load on top cover slab 2kn/m^2. Use M25 grade concrete and Fe415 steel. Design and detail the reinforcement with necessary checks. 12

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AR13

CODE: 13ME3020 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, July-2019

HEAT TRANSFER
(Mechanical Engineering)

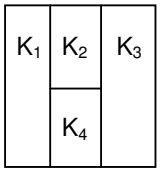
Time: 3 Hours **Max Marks: 70**

Note: Heat and Mass Transfer data book is allowed.
Symbols and abbreviations have their regular meaning.

PART-A

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

1. a) Define thermal conductivity.
   b) Draw electrical network to represent conduction heat transfer trough the following composite slab. Assume temperature difference across the slab.



   c) Define fin efficiency.
   d) What is the significance of critical radius of insulation?
   e) What is boundary layer thickness for external forced convection flow over flat plate?
   f) Write expressions for Reynolds number and Nusselt number.
   g) What is NTU? Write an expression to calculate NTU.
   h) Define transmissivity and absorptivity of a material.
   i) Define Radiosity and Irradiation.
   j) Write mathematical expression for summation rule of shape factors.

PART-B

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

UNIT-I

2. a) State and explain the modes of heat transfer.
   b) Derive the generalized heat conduction equation in three dimensional Cartesian coordinates.

(OR)

3. a) What are the basic assumptions used to derive expression for heat conduction in simple slabs using Fourier law of heat conduction?
   b) A pipe with an outside diameter of 6.2 cm and a surface temperature of $10^{o}C$ is to be covered with a 2.54 cm thickness of granulated cork insulation and a 2.54 thickness of mineral wool. Which insulation should be placed next to the pipe surface to achieve the maximum insulating effect, if the outer surface temperature is $40^{o}C$ in either instance?

UNIT-II

4. a) Describe the classification of fins with their relevant applications.
   b) Derive the expression for temperature distribution for a long fin.

(OR)

5. a) What is meant by Lumped capacity? What are physical assumptions necessary for Lumped capacity unsteady state analysis.

   b) A metallic sphere of radius 12 mm is initially at a uniform temperature of 440 ^{0}C. It is heat treated by first cooling in air (h = 8 W/m^{2}K) at 25 ^{0}C until its central temperature reaches 350 ^{0}C. It is then quenched in water bath at 30 ^{0}C with h = 6200 W/m^{2}K until the centre of the sphere cools from 350 ^{0}C to 60 ^{0}C. Compute the time required for cooling in air and water for the following properties of the sphere, ρ = 3200 kg/m^3, c = 1100 J/kgK, k = 21 W/mK and α = 6.12 x 10^{-6} m^2/sec

UNIT-III

6. a) Define the following terms and explain their significance:
   i. Nusselt number ii. Prandtl number

   b) Ethylene glycol enters a 5 m length of 0.1m diameter copper tube in a cooling system at a velocity of 5 m/s. Estimate the heat transfer rate if the average bulk temperature is 20^{0}C and the tube wall is maintained at 100^{0}C. The properties of ethylene glycol at 20^{0}C are as follows. Thermal conductivity is 0.249 W/m-K, Kinematic viscosity is 1.92x10^{-5} m^2/s, Pr = 204

(OR)

7. a) State and explain Buckingham's π theorem for forced convection heat transfer analysis.

   b) Consider atmospheric air at u_∞ = 2 m/s and at T_∞ = 300 K flow over an isothermal flat plate of length L = 1 m maintained at a temperature T_s = 350 K. Compare the local coefficient at the leading and trailing edges of the heated plate with and without an unheated starting length of ξ = 1 m.

UNIT-IV

8. a) Explain the concept of boundary layer formation for natural convection flow over a vertical flat plate.

   b) A steam pipe 0.05 m diameter and 2.5 m long has been placed horizontally and exposed to still air at 25 ^{0}C. If the pipe wall temperature is 295 ^{0}C, determine the rate of heat loss. At the mean temperature of 160 ^{0}C, the thermo-physical properties of air are: Thermal conductivity is 0.036 W/(m.K), kinematic viscosity is 30.09 $\times$ 10^{-6} m^2/s, Pr = 0.682. For laminar flow over horizontal cylinders within the range $10^3 < (Gr.\ Pr) < 10^9$, use Nu = 0.53 $(Gr.Pr)^{0.25}$.

(OR)

9. a) Derive LMTD expression for parallel flow heat exchanger.

   b) A single pass counterflow intercooler is used to cool 2.142 kg/s of air (C_p = 1017 J/kgK), at 105 ^{0}C with water flowing through tubes at a rage of 2.083 kg/s. The water enters at 25 ^{0}C and the overall heat transfer coefficient is 150 W/m^{2}K based on the outer tube surface area of 20.45 m^2. Using the NTU method estimate the exit temperature of the air.

UNIT-V

10. a) What are the salient features of Plank's distribution law of black body radiation?

    b) Two large parallel planes with emissivities 0.4 (T = 500 K) and 0.8 (T = 700 K) exchange heat. Find the net heat radiated by them and percentage reduction in heat transfer when polished Aluminium radiation shield, with emissivity 0.04, is placed between them. Also find the temperature of the shield.

(OR)

11. a) Explain the concept of black body radiation.

    b) A boiler furnace lagged with plate steel is lined with fireclay bricks on the inside. The temperature of the outer side of the brick setting is 127^{o}C and the temperature of the inside steel plate is 50^{o}C. Assuming the gap between plate stell and fire clay bricks to be small compared with the size of the furnace, find the loss of heat/unit area by radiation between the lagging and setting. Consider ϵ_{steel} = 0.6 and $\epsilon_{fireclay}$ = 0.8.

AR13

SUB CODE: 13CS3018 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, July-2019

COMPUTER GRAPHICS
(Computer Science Engineering)

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

PART-A

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

1. a) Define Resolution.
   b) Define pixel.
   c) What is anti aliasing?
   d) What is Refreshing Rate?
   e) List various display devices?
   f) What is Clipping?
   g) Define polygon surface.
   h) What is orthographic projection?
   i) Define a spline.
   j) What is a key-frame?

. **PART-B**

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

UNIT-I

2. a) Explain Random Scan display system. [6M]
   b) Write short notes on Display File structure. [6M]

(OR)

3. a) Explain about Raster scan system architecture. [6M]
   b) If the resolution of display is 1024X1024 and the system needs 8 bits per pixel. Calculate the size of the frame buffer [6M]

UNIT-II

4. Explain Mid Point circle Generation Algorithm with example. [12M]

(OR)

5. a) Illustrate symmetric DDA with example. [6M]
   b) Explain Flood Filling Algorithm. [6M]

UNIT-III

6. a) Explain Rotation with respect to an arbitrary point. [6M]
   b) Explain about Homogeneous coordinates. [6M]

(OR)

7. Explain Sutherland Hodgman polygon clipping algorithm. [12M]

UNIT-IV

8. Derive the matrix for general perspective projection. [12M]

(OR)

9. a) Discuss briefly 3D Transformations. [6M]
   b) Write the properties of BSpline curves. [6M]

UNIT-V

10. a) Discuss Warnock's Algorithm. [6M]
    b) Discuss the steps in Animation design sequence. [6M]

(OR)

11. Explain the following visible surface detection algorithms [12M]
    a. Back –face Algorithm
    b. Z-buffer

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