AR18

CODE: 18CET207 SET-II

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February, 2021

Fluid Mechanics - II

(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)	How the channels are classified into mild, steep and critical slope channels?	6 M
	b)	Find the required longitudinal slope of a circular open channel of radius 2 m when the depth of flow is 1.5 m discharging at a rate of flow of 5 m^3/s. Take Chezy's constant as 50.	6 M

(OR)

2.	a)	Derive the expression for head loss due to hydraulic jump in a rectangular channel of horizontal slope.	6 M
	b)	In a rectangular channel of bed width 5 m with a bed slope of 0.0001, uniform flow is taking place with a normal depth of 1.5 m. Calculate the specific energy of flow assuming Chezy's constant as 50. Also find the minimum specific energy required for the flow and corresponding critical depth.	6 M

UNIT-II

3.	a)	Find an expression for the efficiency of a series of moving flat plates when a jet of water strikes the vanes at one of its tips. Prove that maximum efficiency is 50 %.	6 M
	b)	Water is flowing through a pipe at the end of which a nozzle is fitted. The diameter of the nozzle is 100mm and the head of water at the centre nozzle is 100m. Find the force exerted by the jet of water on a fixed vertical plate. The coefficient of velocity is given as 0.95.	6 M

(OR)

4.	a)	Derive the expression for force exerted by the jet on a inclined plate moving in the direction of the jet.	6 M
	b)	A jet of water of diameter 5 cm strikes a curved plate horizontally at one of its end with a velocity of 20 m/s. The curved plate is moving with a velocity of 8 m/s in the direction of the jet. The jet is deflected to an angle of 150^0. Assuming the plate is smooth, find the force exerted on the plate in the direction of the jet and also efficiency of the jet.	6 M

UNIT-III

5. a) What is a draft tube and mention the uses of it? Describe with neat sketches different types of draft tubes. 6 M

   b) Draw and explain the layout of typical hydropower installation. 6 M

(OR)

6. a) Define and derive the specific speed of a Turbine and also mention its significance. 6 M

   b) The internal and external diameters of an inward flow reaction turbine are 60 cm and 90 cm respectively. The head on the turbine is 40 m. The flow velocity at outlet is 3 m/s and the outlet blade angle is 15^o. The width of the blade at inlet and outlet is 10 cm. Assuming the outlet discharge is radial and hydraulic efficiency 85%, find out the following: (i) Speed of the turbine (ii) Inlet blade angle and inlet guide vane angle (iii) Flow rate through the turbine and power developed by the turbine. 6 M

UNIT-IV

7. a) Obtain an expression for the work done by impeller of a centrifugal pump on water per second per unit weight of water? 6 M

   b) The internal and external diameters of the impeller of a centrifugal pump are 200mm and 400mm respectively. The pump is running at 1200 rpm. The vane angles of the impeller at inlet and outlet are 20^0 and 30^0 respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water? 6 M

(OR)

8. a) Define and derive expression for minimum starting speed of a centrifugal pump. 6 M

   b) A centrifugal pump is to discharge 0.25 m^3/s at a speed of 1500 rpm. against a head of 25m. The impeller is 250 mm, its width at outlet is 50 mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller. 6 M

UNIT-V

9. a) Describe Buckingham's π – theorem method of dimensional analysis. 6 M

   b) By using Buckingham's π – theorem method , show that the velocity through a circular orifice is given by $V=\sqrt{2gH}\ \ \mathbf{f}\left\{\frac{D}{H},\frac{\mu}{\rho VH}\right\}$ where H is the head causing the flow, D is the diameter of the orifice, μ is the viscosity, ρ is the mass density and g is acceleration due to gravity. 6 M

(OR)

10. a) Discuss about various model laws to design a model. 6 M

    b) Prove that the scale ratio for discharge for a distorted model is given as $(Q_P/Q_m) = (L_r)_H \times (L_r)_v^{3/2}$ 6 M

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CODE: 18EET207 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February, 2021

ELECTRICAL MACHINES-II

(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) Explain how the rotating magnetic field is produced in the three phase induction Motor? 6M

   b) A 12 pole three phase 600v, 50Hz, star connected, induction motor has rotor resistance and stand still reactance of 0.03 and 0.5 ohm per phase respectively. Calculate i) Speed maximum torque ii) Ratio of full load torque to the maximum torque if the full load speed is 495rpm. 6M

(OR)

2. a) Derive the expression a) Starting Torque b) Running Torque c) Maximum torque for three phase induction motor? 6M

   b) The maximum torque of a three phase induction motor occurs at a slip of 12%. The motor has an equivalent secondary resistance of 0.08 ohm/ phase. Calculate the equivalent load resistance, the equivalent load voltage and the current at the slip, if the gross power output is 9,000watts. 6M

UNIT-II

3. a) What are the different staring methods for induction motor and Explain the auto transformer starting method for three phase induction motor? 6M

   b) A six pole, 50Hz three phase induction motor running at 960rpm on full load 4% slip develops a torque of 149.3N-m at its pulley rim. The friction and Windage losses are 200W and stator Cu and iron loses equal 1,620W. Calculate the i) Output power ii) the rotor Cu losses iii) the effiency at full load. 6M

(OR)

4. Draw the circle diagram from no load and short circuit test of a three phases 14.92 KW, 400V 6 pole induction motor from the following text results (Line Voltage) 12M

   No-Load : 400V, 11A, P. F= 0.2

   Short circuit : 100V, 25A, P. F= 0.4

   Rotor Cu loss at stand still in half the total Cu loss. From the circle diagram find i) Line current, Slip, efficiency and power factor at full load ii)The maximum torque.

UNIT-III

5. a) Explain the constructional details and working of the alternator with neat sketch? 6M

   b) Find the value of K_d for an alternator with 9 slots for pole for the following cases (i). One winding in all the slots ii) One winding using only the first 2/3 of the slots per pole (iii) Three equal windings placed sequentially in 60^o group. 6M

(OR)

6. a) With relevant diagrams, explain the effect of load power factor on the armature reaction of an alternator? 6M

   b) A three phase 8 pole, 750 rpm star connected alternator has 72 slots on the armature. Each slot has 12 conductors and winding is short circuited by two slots. Find the induced emf between the lines, give the flux per pole is 0.06wb. 6M

UNIT-IV

7. a) What are the conditions to be followed for parallelizing of alternator? 6M

   b) Two alternators working in parallel supply the following loads 1). Lighting load of 500kw 2). 1.000 KW at 0.9 pf lag (3) 500kw at 0.9 pf lead 4). 800 kw at 0.8 pf lag. One alternator is supplying 1500 kw at 0.95 pf lag. Calculate the load on the other machine. 6M

(OR)

8. a) Define voltage regulation and explain how the voltage regulation will be calculated by synchronous impedance method. 6M

   b) A 100- KVA, 3000V, 50Hz, three phase star connected alternator has effective armature resistance of 0.2ohm.The field current of 40A A produces short circuit current 200A and an open circuit EMF of 1040V(Line value). Calculate the full load voltage regulation at 0.8 p.f lagging and 0.8 p.f leading by EMF method. 6M

UNIT-V

9. a) What are the different torques in synchronous motor, and derive the expression for the power developed by a synchronous motor? 6M

   b) A75 KW, 400-V, 4-pole three phase star connected synchronous motor has resistance and synchronous reactance per phase of 0.04 ohm and 0.4 ohm respectively. Compute for full load 0.8 p.f lead the open circuit emf per phase and mechanical power developed. Assume an effiency of 92.5%. 6M

(OR)

10. a) Explain how the V and inverted V curves can be obtained in synchronous motor? 6M

    b) Explain various starting methods of synchronous motor.. 6M

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CODE: 18MET205 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February, 2021

IC ENGINES

(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.	a)	Explain the classifications of an IC engine	6 M
	b)	Compare two stroke and four stroke engines.	6 M
		(OR)	
2.	a)	Discuss the importance of air fuel ratio in IC engines	6 M
	b)	Make a comparison between air standard and actual cycles	6 M

UNIT-II

3.	a)	Explain any three different combustion chambers for SI engines	6 M
	b)	Explain the phenomenon of pre-ignition in SI engine. Discuss how pre-ignition leads to detonation and vice-versa	6 M
		(OR)	
4.	a)	Explain fuel injection systems in CI engine	6 M
	b)	What are the factors affecting knocking in CI engines	6 M

UNIT-III

5.	a)	How to analyse the performance of IC engines	6 M
	b)	Explain the concept of Wankel engine	6 M
		(OR)	
6.	a)	Discuss in detail about Stratified charge engine	6 M
	b)	Explain HCCI concept	6 M

UNIT-IV

7.	a)	Explain the methods for controlling emissions in IC engines	6 M
	b)	What are the harmful effects that cause due to pollutions from an automobile	6 M
		(OR)	
8.	a)	Write a short note on alternate fuels for IC engines	6 M
	b)	Write a short notes on use of alcohol fuels	6 M

UNIT-V

9	a)	What is the difference between rotary and reciprocating compressor?	6M
	b)	Explain with a neat sketch the working of an axial flow compressor?	6M
		(OR)	
10	a)	A single cylinder reciprocating air compressor running at 150 rpm delivers to a Receiver 5 m^3 of free air per minute, compressed to a pressure of 6 bar. The suction is at 1 bar and 300 K. Compression and expansion curves follow the law $PV^{1.3}= C$. Clearance is 5 % of the active stroke. Estimate (a) Temperature of air admitted to receiver (b) volumetric efficiency (c) volume of air taken per stroke (d) Dimensions of the cylinder if stroke equals 1.25 times diameter. (e) Power required for compressor.	6M
	b)	Explain the velocity diagrams for finding work done of stage of axial flow compressors.	6M

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CODE: 18ECT209 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February, 2021

DIGITAL ELECTRONICS

(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)	Find the decimal equivalent of the following binary numbers (i) 10011001 (ii)10101011	6M
	b)	Find the Excess-3code and its 9's complement for the following decimal numbers (i) 56 (ii) 812	6M
		(OR)	
2.	a)	What is BCD code? What are the rules for BCD addition? Explain with suitable example.	6M
	b)	Explain even and odd parity codes.	6M

UNIT-II

3.	a)	Implement EX-OR and EX-NOR gates using NAND gate.	6M
	b)	Reduce the following functions using K-map (i) F= $\sum m(0,1,2,3,6,7,13,15)$ (ii) F=$\sum m(2,3,6,7,10,11,12)$	6M
		(OR)	
4.	a)	Simplify the Boolean function $f(A,B,C,D)=\sum m(0,1,4,6,7,9,11,12,14,15)$ using K-map.	6M
	b)	Show that both NAND gate and NOR gate are universal gates.	6M

UNIT-III

5.	a)	Design a Half adder and full adder circuit using NAND gates.	6M
	b)	Explain the logic diagram of BCD adder using 4-bit binary adder.	6M
		(OR)	
6.	a)	Draw the logic diagram of full subtractor using two half subtractors.	6M
	b)	Draw and explain the 4-bit binary subtractor with an example.	6M

UNIT-IV

7.	a)	With the help of logic diagram and truth table, explain decimal to BCD encoder.	6M
	b)	With the help of logic diagram and truth table, explain 4*1 multiplexer.	6M
		(OR)	
8.	a)	With the help of logic diagram and truth table, explain 3-line to 8-line decoder.	6M
	b)	Design a 2-bit comparator.	6M

UNIT-V

9.	a)	Draw the circuit diagram of J-K Flip-flop with NAND gates and explain its operation with the help of a truth table.	6M
	b)	Convert D flip-flop in T-flip flop and J-K flip flop.	6M
		(OR)	
10.	a)	What is race around condition and how to avoid it.	6M
	b)	Draw the circuit diagram of 4 bit Jhonson counter using JK-flip flop and explain its operation.	6M

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CODE: 18CST206 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, February, 2021

OPERATING SYSTEMS

(Common to CSE AND IT)

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 Operating System. List the goals of operating system. 6M
   b) What is System call and explain its types. 6M

(OR)

2. a) Define process and explain with a neat diagram about process states 6M
   b) What is the average turnaround time for the following processes using a)FCFS b) SJF non-preemptive c)Round Robin 6M

Process	Arrival Time	Burst Time
P1	0	8
P2	4	4
P3	1	1

UNIT-II

3. a) Discuss briefly the procedure for implementing a monitor using semaphores. 6M
   b) Elaborate on Critical – section problem in detail 6M

(OR)

4. a) Explain Banker's algorithm for deadlock detection. 6M

   b) Consider the following snapshot of the system 6M

PROCESS	ALLOCATION				MAX				AVAILABLE			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

i)Find whether this system is safe or not. Also find safe sequence that satisfies safety requirement.

ii) If a request from process P1 arrives for (0, 4, 2, 0) can the request be granted immediately?

UNIT-III

5. a) What is paging? Describe in detail about general method with hardware implementation of paging. 6M

   b) Explain in detail about FIFO page replacement algorithm. 6M

(OR)

6. a) Compute the number page faults for LRU, optimal page replacement strategies for the given reference string 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2 with 3 page frames. 6M

   b) What is segmentation? Explain in detail about general method with hardware implementation of segmentation. 6M

UNIT-IV

7. a) Explain how free space is managed. 6M

   b) Discuss in detail about different file allocation methods. 6M

(OR)

8. a) Given memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 236 KB, 543 KB, 92 KB and 350 KB (in order)? Which algorithm makes the most efficient use of memory? 6M

   b) Explain the process of file mounting? Illustrate with an example. 6M

UNIT-V

9. a) Explain swap space management in detail. 6M

   b) Discuss the overview of mass storage structure with a neat sketch. 6M

(OR)

10. a) Explain any disk scheduling algorithm in detail. 6M

    b) Explain the parameters used in selection of appropriate disk scheduling algorithm. 6M

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