AR18

CODE: 18CET207 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular Examinations, November- 2020

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) Derive the condition for maximum discharge in a circular open channel. 6 M
   b) A rectangular channel is 20 m wide and carries a discharge of 60 m^3/s. It is laid at a slope of 0.0001. At a certain section along the channel length, the depth of flow is 2 m. Name the water surface profile. How far upstream/downstream will the depth be 2.5 m? Take Manning's n as 0.02. 6 M

(OR)

2. a) Derive the relation between alternate depths and critical depth for a given specific energy and discharge intensity in a rectangular open channel. 6 M
   b) Find the % head loss that takes place in a rectangular channel of bed width 3 m when the pre-jump depth is 0.5m for a discharge of 10 m^3/s. 6 M

UNIT-II

3. a) Derive the expression for work done per sec when flow is taking place through a series of radial curved vanes mounted on a wheel. 6 M
   b) A jet of water having a velocity of 30 m/s strikes a cured vane, which is moving with a velocity of 10 m/s. The jet makes an angle of 20° with the direction of motion of vane at inlet and leaves at an angle of 120° to the direction of motion of vane at outlet. Calculate i) vane angles, if the water enters and leaves the vane without shock, ii) work done per second per unit weight of water striking the vanes per second. 6 M

(OR)

4. a) Derive the expression for work done/sec by the jet on a curved plate which is moving in the direction of jet and also determine the efficiency of jet on vane. 6 M
   b) A jet of water of diameter 7.5 cm strikes a curved plate at its centre 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 165^0. 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) Explain in detail about various efficiencies of a Turbine. 6 M

b) The following data is given for a Francis turbine: Net head = 50 m, speed = 600 rpm, shaft power = 350 kW, hydraulic efficiency = 95%, flow ratio=0.25, breadth ratio=0.1, outer diameter of the runner = 2 x inner diameter of the runner. The thicknesses of vanes occupy 5% of the circumferential area of the runner. Velocity of flow is constant at inlet and outlet and discharge is radial at outlet. Determine guide blade angle, runner vane angles at inlet and outlet, diameters of the runner at inlet and outlet, width of wheel at inlet. 6 M

(OR)

6. a) Discuss about classification of Turbines. 6 M

b) A pelton wheel has a mean bucket speed of 35 m/s with a jet of water flown at the rate of 1 m^3/s under a head of 270 m. The buckets deflect the jet through an angle of 170°. Calculate the power delivered to the runner and hydraulic efficiency of the turbine. Assume coefficient of velocity as 0.98. 6 M

UNIT-IV

7. a) Define and derive the expression for NPSH. 6 M

b) A centrifugal pump has the following characteristics: Outer diameter of the impeller = 700 mm; Width of the impeller vanes at outlet = 100 mm; Vane angle at outlet = 45^0; Speed of the impeller = 500 rpm; Discharge = 1 m^3/s; Manometric head = 30 m; A 500 kW motor is used to drive the pump. Determine the manometric, mechanical and overall efficiencies of the pump. Assume water enters the impeller radially at inlet. 6 M

(OR)

8. a) Define specific speed of a centrifugal pump. Also derive the expression for the same. 6 M

b) A three stage centrifugal pump has impeller has 50 cm in diameter and 2.5 cm wide at outlet. The vanes are curved back at outlet at 30^0 and reduce circumferential area by 15%. The manometric efficiency is 85% and overall efficiency is 80%. Determine the head generated by the pump when running at 1200 rpm and discharge is 0.05 m^3/sec. Also find the shaft power. 6 M

UNIT-V

9. a) Define and derive different dimensionless numbers involved in Fluid mechanics. 6 M

b) Assuming that the rate of flow Q of a centrifugal pump is dependent upon the mass density ρ of fluid, pump speed N in rpm, the diameter of impeller D, the pressure p and viscosity of fluid μ, show that $\frac{Q}{ND^3} = \emptyset\left[\left(\frac{P}{\rho N^2 D^2}\right)\left(\frac{\mu}{\rho N D^2}\right)\right]$ 6 M

(OR)

10. a) Describe Rayleigh's method of dimensional analysis. 6 M

b) Explain the importance of model testing and also discuss about the criteria for the model is similar to prototype. 6 M

AR18

CODE: 18EET207 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular Examinations November-2020

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 the working principle of three phase induction motor with neat sketch? 6M
   b) A three phase, 50Hz, 8 pole, induction motor has full load slip of 2%. The rotor resistance and stand still rotor reactance per phase are 0.001ohm and 0.005 ohm respectively. Find the ratio of the maximum to the full load torque and speed at which the maximum torque occurs. 6M

(OR)

2. a) Draw and explain the torque slip characteristics of the three phase induction motor. 6M
   b) Derive the expression for torque in a three phase induction motor. 6M

UNIT-II

3. a) What are the different starting methods for three phase induction motor? Explain any one starting method. 6M
   b) A three phase induction motor has a 4 pole, Star connected stator winding. The motor runs on 50Hz supply with 2000v between lines. The motor resistance and stand still reactance per phase are 0.1 ohm and 0.9 ohm respectively. Calculate i) The total torque at 4% slip ii) The maximum torque iii) The speed at maximum torque if the ratio of the rotor to stator turns is 0.67. Neglect stator impedance. 6M

(OR)

4. A 415-V, 29.84KW, 50Hz , delta connected motor gave the following text data 12M

No-Load	: 415V,	21A,	1,250W
Short circuit	: 100V,	45A,	2,730W

Construct the circle diagram and determine a) The line current and power factor for rated output b) The Maximum torque. Assume Stator and Rotor Cu loss at stand still.

UNIT-III

5. a) Derive the EMF equation of an alternator? 6M
   b) The stator of a three phase, 16 pole alternators has 144 slots and four conductors per slot connected in two layers and the conductors of each phase are connected in series. If the speed of the alternator is 375 r.p.m, Calculate the emf induced per phase. Resultant flux in the air gap is 5×10^{-2} Webers per pole sinusoidal distributed. Assume the coil span as 150^0 electrical. 6M

(OR)

6. What is armature reaction? Explain the effect of armature reaction on the terminal voltage of an alternator at i) Unity power factor load ii) Zero leading power factor loads draw the relevant phasor diagrams. 12M

UNIT-IV

7. a) Explain the procedure for the determination of voltage regulation by ZPF Method? 6M
   b) A 750-KVA, 11KV, 4 pole, 3 phase, star connected alternator has percentage resistance and reactance of 1 and 15respectively. Calculate the synchronizing power per mechanical degree of displacement at a) No-load b) At full load 0.8 P.F lag. The terminal voltage in each case is 11KV. 6M

(OR)

8. a) Explain the two reactance for salient pole synchronous machines. 6M
   b) Explain the procedure for the determination of voltage regulation by synchronous impedance Method? 6M

UNIT-V

9. a) Explain the effecting of changing excitation on constant load for synchronous motor? 6M
   b) Explain various starting methods of three phase synchronous motors. 6M

(OR)

10. a) Explain the effect of excitation on armature control and power factor for synchronous motor? 6M
    b) A 6600V Star connected three phase synchronous motor works at constant voltage and constant excitation. Its synchronous reactance is 20 ohm per phase and armature resistance negligible. When the input power is 1000KW, the power factor is 0.8 leading. Find the power angle and power factor when the input is increased to 1500kW. 6M

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AR18

CODE: 18MET205 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular Examinations, November, 2020

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 working of a 4 stroke diesel engine with a neat sketch.	6M
	b)	Compare 2 stroke and 4 stroke engine in detail.	6M
		(OR)	
2.	a)	Explain battery ignition system with a neat sketch.	6M
	b)	State and explain the reason for expansion curve of a real engine cycle is lower than actual engine cycle.	6M

UNIT-II

3.	a)	Discuss the theories of abnormal combustion in detail.	6M
	b)	Explain TBI and MPFI in detail	6M
		(OR)	
4.	a)	Explain the combustion in an SI with help of a P-Θ diagram.	6M
	b)	Discuss the factors that effect knock in SI engine.	6M

UNIT-III

5.		Define and explain the terms i) Brake thermal efficiency ii) Mechanical efficiency iii) Indicated thermal efficiency iv) Compression ratio v) Indicated mean effective pressure vi) Specific fuel consumption	12M
		(OR)	
6.	a)	A four cylinder engine running at 1200rpm delivers 20 kW. The average torque when one cylinder was cut is 110 Nm. Find the indicated thermal efficiency if the calorific value of the fuel is 43 MJ/kg and the engine uses 360 gms of gasoline per kW h.	6M
	b)	Discuss HCCI princple in detail. How different is it from conventional diesel engine?	6M

UNIT-IV

7.	a)	What is EGR? Explain its principle and working with neat possible sketches.	6M
	b)	Discuss the advantages and disadvantages of Hydrogen as an IC engine fuel.	6M
		(OR)	
8.	a)	List the various pollutants from an engine. Explain the formation of NOx and CO in detail.	6M
	b)	Explain the advantages and disadvantages of biodiesels as an alternate source of fuel in an IC engine.	6M

UNIT-V

9.	a)	Explain the working of centrifugal compressor with the help of a neat sketch	6M
	b)	Define isothermal and volumetric efficiencies as applied to reciprocating compressors and derive for volumetric efficiency when suction conditions and free air conditions are different.	6M
		(OR)	
10.		Explain the following with neat sketch i) Roots blower ii) Axial flow compressors	12M

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AR18

CODE: 18ECT209 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular Examinations, November-2020

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)	Convert $(105.15)_{10}$= (-----)$_2$; $(111001.1)_2$= (-----)$_{10}$; $(365)_8$= (-----)$_{10}$?	6M
	b)	Explain about Weighted Codes with examples?	6M
		(OR)	
2.	a)	Perform BCD and Excess 3 Subtraction for (i) 78-13?	6M
	b)	Find the Hamming code for 0111 and 0110 by using even parity and find the distance between them?	6M

UNIT-II

3.	a)	Design a 4Bit gray to binary Code convertor?	6M
	b)	Simplify F=$\sum$ (0, 1, 4, 5, 7, 9, 11, 13, 15) using K Map and write the simplified output expression?	6M
		(OR)	
4.	a)	State and Prove DeMorgans theorems. Find Dual and complement of the expression (A+B)(C+DEF)?	6M
	b)	Simplify F=$\sum$ (0, 1, 3, 7, 8, 9, 10, 11, 14, 15) using Tabulation method and write the simplified expression?	6M

UNIT-III

5.	a)	What is the need for carry look ahead adder operation and justify it?	6M
	b)	Design Full adder using Half Adders?	6M
		(OR)	
6.	a)	Explain the operation of Binary Adder circuit with neat diagrams?	6M
	b)	Design a 4 Bit binary Excess 3 Adder?	6M

UNIT-IV

7.	a)	Design 1:8 and 1:16 DeMultiplexer?	6M
	b)	Implement Half Adder and Full Adder.	6M
		(OR)	
8.	a)	Design a 3 bit Magnitude Comparator?	6M
	b)	Implement the function F=$\sum$ (0, 1, 3, 4, 8, 9, 15) using 8:1 and 16:1 Multiplexer?	6M

UNIT-V

9.	a)	Design a MOD 6 Synchronous Counter using Flipflop?	6M
	b)	Write about Johnson counter with neat diagram.	6M
		(OR)	
10.	a)	Design a MOD 10 Asynchronous Counter using JK Flipflop?	6M
	b)	Convert T and D Flipflops to JK Flipflops?	6M

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AR18

CODE: 18CST206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular Examinations, November-2020

OPERATING SYSTEMS

(Common to CSE & 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)	Explain the various types of system calls provided by an operating system.	**6M**
	b)	Explain the operating system structure and its functions.	**6M**
		(OR)	
2.	a)	Explain the steps involved in process creation and process termination.	**6M**
	b)	Demonstrate FIFO and Round Robin CPU scheduling algorithms with suitable example.	**6M**

UNIT-II

3.	a)	Explain deadlock avoidance using banker's algorithm with suitable example.	**6M**
	b)	How to Recover From Deadlock situations? Discuss in detail.	**6M**
		(OR)	
4.	a)	What is monitor? Explain its functionalities. How it is different from semaphore in implementing synchronization.	**6M**
	b)	What is Producer Consumer problem? How it can illustrate the classical problem of synchronization? Explain.	**6M**

UNIT-III

5.	a)	Explain about contiguous memory allocation.	**6M**
	b)	Explain LRU page replacement algorithm.	**6M**
		(OR)	
6.	a)	What is a Virtual Memory? Discuss the benefits of virtual memory technique.	**6M**
	b)	What is Thrashing? What is the cause of Thrashing? How does the system detect Thrashing? What can the system do to eliminate this problem ?	**6M**

UNIT-IV

7.	a)	Explain various file access methods with suitable examples.	**6M**
	b)	Discuss about file sharing	**6M**
		(OR)	
8.	a)	Discuss the different file allocation methods with suitable example.	**6M**
	b)	Explain free space management	**6M**

UNIT-V

9.	a)	Discuss about I/O devices	**6M**
	b)	Explain I/O buffering	**6M**
		(OR)	
10.	a)	Explain disk attachment	**6M**
	b)	Discuss various issues involved in selecting appropriate disk scheduling algorithm.	**6M**

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