AR16

CODE: 16CE2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, October / November-2020

HYDRAULICS AND HYDRAULIC MACHINERY

(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) Describe the Buckingham's method of dimensional analysis. **6M**
   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 $\frac{Q}{ND^3} = \emptyset\left[\left(\frac{p}{\rho N^2 D^2}\right)\left(\frac{\mu}{\rho N D^2}\right)\right]$ **8M**

(OR)

2. a) Discuss Rayleigh's method of dimensional analysis. **6M**
   b) show that the velocity through a circular orifice is given by $V=\sqrt{2gH}$ 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. **8M**

UNIT-II

3. a) Derive the condition for most economical trapezoidal section of an open channel. **6M**
   b) Find the possible maximum discharge in a rectangular channel of width 3 m for a specific energy of 2.5 m. **8M**

(OR)

4. a) Derive the expression for head loss due to hydraulic jump in a rectangular channel of horizontal slope. **6M**
   b) A rectangular channel is 20 m wide and carries a discharge of 65 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 2.6 m ? Take Manning's n as 0.02. **8M**

UNIT-III

5. a) Obtain an expression for the work done per second by runner on a series of radial curved vanes fixed to a wheel, while the jet is entering at one tip and leaving at other tip. **6M**
   b) A jet of water having a velocity of 30 m/s strikes a curved vane, which is moving with a velocity of 15 m/s. The jet makes an angle of 30° 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. **8M**

(OR)

6. 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 %. **6M**

b) A jet of water of the diameter 100 mm strikes a curved plate at its centre with a velocity of 15 m/s. The curved plate is moving with a velocity of 7 m/s in the direction of the jet. The jet is deflected through an angle of 150°. Assume the plate is smooth find i) force exerted on the plate in the direction of the jet, ii) power of the jet, and iii) efficiency. **8M**

UNIT-IV

7. a) 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. **8M**

b) Describe the components, working principle of Francis turbine with a neat sketch and derive the expression of hydraulic efficiency of Francis turbine. **6M**

(OR)

8. a) What do you mean by gross head, net head of turbine? Explain the different types of the efficiencies of a turbine. **6M**

b) Find the diameter of runner, vane angles of a Francis turbine for the following data. Net head H=68 m. Speed N=750 rpm. Output power P=330kW. Hydraulic efficiency = 94% and overall efficiency = 85%; Flow ratio =0.15; Breadth ratio = 0.1; Inner diameter of the runner = half of the outer diameter. Also assume 6% of the circumferential area of the runner to be occupied by the thickness of the vanes. Velocity of flow remains constant throughout and the flow is radial at exit. **8M**

UNIT-V

9. a) Derive the expression for specific speed of the centrifugal pump. **6M**

b) A three stage centrifugal pump has impeller 40cm 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 75%. Determine the head generated by the pump when running at 1200 rpm and discharge is 0.06 m^3/sec. Find the shaft power also. **8M**

(OR)

10. a) How will you obtain an expression for minimum starting speed of a centrifugal pump? Also draw the operating characteristic curves of the centrifugal pump. **6M**

b) A centrifugal pump has the following characteristics: Outer diameter of the impeller = 800 mm; Width of the impeller vanes at outlet = 100 mm; Vane angle at outlet = 40^0; Speed of the impeller = 550 rpm; Discharge = 0.98 m^3/s; Manometric head = 35 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. **8M**

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AR16

CODE: 16EE2012 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, October / November-2020

ELECTRICAL MACHINES-II

(Electrical & 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)	Explain how rotating magnetic field is produced in 3 Θ induction motor and, what the speed of the rotating magnetic field?	**7M**
	b)	An Induction Motor with 3-Phase star – connected rotor has a rotor resistance and standstill reactance of 0.1 ohm per phase and 0.5 ohm respectively. The slip –rings are connected to a star connected resistance of 0.2 ohm per phase. If the standstill voltage between slip – rings is 200volts, calculate the rotor current per phase when the slip is 5%, the resistance being still in circuit.	**7M**

(OR)

2.	a)	Draw the Torque Slip Characteristics of 3-phase induction motor with necessary equations and justify your answer.	**6M**
	b)	A 440v, 3phase, 50HZ, 4 pole, Y connected induction motor has a full load speed of 1425 rpm. The rotor has an impedance of (0.4+4J) ohm and rotor /stator turns ration of 0.8. Calculate (i) full load torque (ii) rotor current and full load rotor copper loss (iii) power output if windage and friction losses amount to 500W.	8M

UNIT-II

3.	a)	What are different starters used for 3 phase induction motor? In each case give the ratio between starting torque and full load torque	**7M**
	b)	Explain how Efficiency can be calculated from No Load and Blocked rotor Test Data using circle diagrams.	**7M**

(OR)

4.	a)	State different methods of speed control of three phase Induction Motor?	**4M**
	b)	Explain the following schemes of speed control with neat sketches (i) Cascade method (ii) Frequency control Method.	**10M**

UNIT-III

5. a) Distinguish between Salient Pole Rotor and Non-salient pole rotor synchronous Machines? **6M**

   b) A three phase, 16 pole, star connected alternator has 144 slots on the armature periphery. Each slot contains 10 conductors. It is driving at 375 rpm .The line value of emf available across the terminals is observed to be 2.657 KV. Find the frequency of the induced emf & flux per pole. **8M**

(OR)

6. a) Explain the effect of armature reaction on terminal voltage of an alternator when the load power factor is (i) UPF (ii) ZPF lagging (iii) ZPF leading. **7M**

   b) Derive the EMF equation of an alternator in terms of pitch and distribution factors. **7M**

UNIT-IV

7. a) Describe the mmf method for predetermining the voltage regulation of an alternator. **6M**

   b) A 600V, 60KVA, Single phase alternator has an effective resistance of 0.2 ohm. A field current of 10A produces an armature current of 210A on short circuit and an emf of 480V on open circuit. Calculate: (i) Synchronous Impedance and reactance; (ii) Full Load Regulation at 0.8 pf Lagging. **8M**

(OR)

8. a) Discuss the effect of variations of excitation and mechanical input for one of the two identical alternators which are equally loaded when they are in parallel. **6M**

   b) Describe the synchronous impedance method for predetermining the voltage regulation of an alternator. **8M**

UNIT-V

9. a) Explain why Synchronous motor is not self starting and how do you make it self-starting. **7M**

   b) Explain what is hunting? How it is prevented. **7M**

(OR)

10. a) What are 'V' and inverted 'V' curves? Explain them with necessary theory and phasor diagrams. **7M**

    b) A synchronous motor absorbing 60KW is connected in parallel with a factory load of 240KW having a lagging p.f of 0.8. If the combined load has a p.f of 0.9. What is the value of the leading KVAR supplied by the motor and at what p.f is it working? **7M**

AR16

CODE: 16ME2010 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, October / November-2020

THERMAL ENGINEERING - I

(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)	Explain why actual cycle efficiency is much lower than the air standard cycle efficiency	8M
	b)	What is time loss factor? Discuss the effect of time losses in an actual cycle and explain the reasons for reduction in efficiency	6M
		(OR)	
2.	a)	Explain the actual port timing diagram of a two stroke SI engine and compare with ideal port timing diagram	8M
	b)	Define volumetric efficiency and discuss the effect of various factors affecting the volumetric efficiency	6M

UNIT-II

3.	a)	What are the basic parameters that influence the flame speed? Discuss the influence of engine variables on the flame speed?	8M
	b)	Explain different stages of combustion in S.I. Engine along with p-θ diagram	6M
		(OR)	
4.	a)	What are different methods to control the knocking in S.I. Engine? Explain	8M
	b)	Draw the schematic diagram of simple carburetor and explain its working principle	6M

UNIT-III

5.	a)	What is diesel knock? How to minimize knocking in CI engine?	8M
	b)	What is Physical delay? Discuss the factors that affect the delay period in a C.I. engine	6M
		(OR)	
6.	a)	Bringing out clearly the process of combustion in CI engines and also explain various stages of combustion	7M
	b)	Explain the term delay period as referred to CI engines. Explain the effect of speed and fuel-air ratios on delay period of CI engines	7M

UNIT-IV

7. a) The following date was recorded during testing of a four stroke cycle gas engine. Area of indicator diagram = 900 mm2; Length of indicator diagram = 70 mm; spring scale = 0.3 bar/mm; Diameter of piston = 200 mm; Length of stroke = 250 mm; Speed = 300 rpm. Determine i) Indicated mean effective pressure ii) Indicated power — 8M

   b) What is the use of heat balance sheet of an engine? Mention the various items to be determined to complete the heat balance sheet — 6M

(OR)

8. The following results were obtained in a test on a gas engine: Gas used = 0.16 m3/min at NTP, Calorific value of gas at NTP = 14 MJ/m3, Density of gas at NTP = 0.65 kg/m3, Air used = 1.50 kg/min, Specific heat of exhaust gas = 1.0 kJ/kg K, Temperature of exhaust gas = 4000C, Room temperature = 200C, Cooling water per minute = 6kg, Specific heat of water = 4.18 kJ/kg K, Rise in temperature of cooling water = 300C, ip =12.5 kW, bp = 10.5 kW. Draw a heat balance sheet for the test on per hour basis in kJ — 14M

UNIT-V

9. a) Derive the expression for work done when compression is isothermal for a single stage reciprocating air compressor. — 7M

   b) An air compressor takes in air at 1 bar and 200C and compresses it according to law pv1.2=constant. It is then delivered to a receiver at a constant pressure of 10bar. R= 0.287 kJ/kg K. Determine: (i) Temperature at the end of compression; (ii) Work done and heat transferred during compression per kg of air — 7M

(OR)

10. Explain the working of (a) reciprocating air compressor b) centrifugal air compressor — 14M

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AR16

CODE: 16EC2010 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, October / November-2020

DIGITAL ELECTRONICS

(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)	Convert the following i. $(378.93)_{10}$ to Octal ii. $(1000010101)_2$ to Gray number iii. $(3A7)_{16}$ in to Decimal number. iv. $(1762.46)_8$ to Hexadecimal	8M
	b)	Explain about Error detection and error correction codes with example?	6M
		(OR)	
2.	a)	Subtract the following decimal numbers using 1's and 2's complement method. i. 52-17 ii. 27-75	8M
	b)	Classify the binary number codes and explain any three type's codes with example.	6M

UNIT-II

3.	a)	i. Obtain the dual of the Boolean expression A'B'C'+A'BC' + AB'C'+ABC'. ii. Reduce the Boolean expression. (A'+C)(A'+C')+(A'+B+C) iii. Find the complement of Boolean expression. (AB'+AC')(BC+BC')+ABC'	6M
	b)	Minimize the given function using K-Map method and implement in a Universal logic. F(A,B,C,D)= ∑m (0, 2, 4, 6, 7, 8, 10, 12, 13, 15).	8M
		(OR)	
4.	a)	i. Realize XOR function using in universal logic ii. Minimize the given function using K-Map method and implement in a Universal logic. F(A,B,C,D)= ∑m (1,3,5,9,11,14).	8M
	b)	Design of a 4-bit BCD to XS-3 code converter.	6M

UNIT-III

5.	a)	Realize Full Adder using two Half adders and logic gates..	6M
	b)	Design an Excess-3 adder using 4-bit parallel binary adder and logic gates.	8M
		(OR)	
6.	a)	Realize the Full-Sub tractor using NAND Logic.	6M
	b)	With figure explain the operation of the following circuits i. 4-bit Binary Ripple Carry adder ii. 4-bit binary Adder-Subtractor	8M

UNIT-IV

7.	a)	Draw and explain the truth table and Logic diagram of a 3 line to 8 line Decoder.	6M
	b)	Realize the logic expression of f (A,B,C,D) = ∑(0,1,3,5,6,8,9,11,12,13) using 8:1 MUX and 16:I MUX, explain its procedure.	8M
		(OR)	
8.	a)	Implement BCD to 7 Segment Decoder for common anode using 4:16 Decoder.	8M
	b)	What is a comparator? Draw the logic diagram of a 4-bit comparator.	6M

UNIT-V

9.	a)	i. Distinguish between combinational and sequential circuits? ii. With logic diagram explain the operation of a D flip-flop	6M
	b)	Design of a MOD-10 asynchronous counter using JK flip-flops	8M
		(OR)	
10.	a)	Explain the procedure in detail for converting SR flip-flop into JK flip-flop.	7M
	b)	Explain the operation of 4-stage Ring counter and draw the logic circuit of the same using JK flip-flops.	7M

AR16

CODE: 16CS2009 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular & Supplementary Examinations, October / November-2020

OPERATING SYSTEMS

(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 Evolution of an Operating System. **7M**
   b) List and explain the various categories of System calls. **7M**

(OR)

2. a) Explain Process concept. Explain various states of a process with the help of a transition diagram. **6M**
   b) Consider the following information (assume smallest value indicates highest priority) **8M**

Process	Arrival Time(ms)	Burst Time(ms)	Priority
P1	0	10	1
P2	3	6	2
P3	7	1	4
P4	8	3	3

I. Calculate average waiting and average turn around time using Non pre-emptive Priority CPU Scheduling Algorithm.
II. Calculate average waiting and average turn around time using Pre-emptive Priority CPU Scheduling Algorithm.

UNIT-II

3. a) What is a deadlock? Explain deadlock avoidance algorithm with one example. **8M**

   b) Explain various methods used to recover from deadlock after detection algorithm detects the deadlock. **6M**

(OR)

4. a) What are the different ways available to handle critical section problem? Explain synchronization hardware with respect to critical section problem. **7M**

   b) Illustrate the procedure to implement a monitor. **7M**

UNIT-III

5. a) Write the need of swap-in and swap-out operations? **6M**

   b) List and explain the techniques for structuring the page table? **8M**

(OR)

6. a) Demonstrate in detail Copy-on-Write technique? **6M**

   b) Identify how many number of page faults by using the optimal and LRU replacement policy if the page reference string is 1, 2, 3, 4, 2, 1, 5, 3, 2, 4, 6. Assume that there are 3 page frames which are initially empty. **8M**

UNIT-IV

7. a) Explain the types of Directory Structure? **7M**

   b) Explain the techniques in file sharing? **7M**

(OR)

8. a) With a neat sketch, illustrate directory allocation techniques. **7M**

   b) Explain free space management. **7M**

UNIT-V

9. a) Explain disk structure. **7M**

   b) Illustrate swap space management. **7M**

(OR)

10. Consider the following disk requests: 98, 183, 37, 122, 14, 124, 65, 67, 10, 150 with the disk head at the cylinder 51. (Assume cylinder range from 0 to 199) Calculate the seek time by using: **14M**

    i) FCFS disk scheduling ii) SSTF disk scheduling

    iii) SCAN disk scheduling iv) C-SCAN disk scheduling

    v) LOOK disk scheduling vi) C-LOOK disk scheduling

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AR13

CODE: 13CE2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, October / November-2020

HYDRAULICS AND HYDRAULIC MACHINERY

(Civil Engineering)

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

PART-A

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

1. a) Define impact of jets.
   b) Force exerted by the jet in the direction of jet, while jet strikes the stationary curved plate at one end tangentially.
   c) How to select repeating variables?
   d) What is Froude model law?
   e) Define critical velocity for open channel flows.
   f) Define Hydraulic jump.
   g) Define efficiency of draft tube.
   h) Define unit speed of the turbine.
   i) Why multi staging is carried out in centrifugal pump?
   j) Why priming is needed in centrifugal pump?

PART-B

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

UNIT-I

2. a) Explain Rayleigh method with suitable example [6]
   b) In flow over a smooth flat plate, the boundary layer thickness δ is found to depend on the free stream velocity u, fluid density ρ, viscosity μ and the distance x from the leading edge. Express the correlation in the form of dimensionless groups. [6]

(OR)

3. a) What are the similarity laws [6]
   b) What is meant by dimensional analysis? And uses.. [6]

UNIT-II

4. a) Define the term most economical section of a channel. What are the conditions for the rectangular channel of the best section? [6]
   b) A flow of water of 100 litres per second flows down in a rectangular flume of width 600 mm and having adjustable bottom slope. If Chezy's constant C is 56, find the bottom slope necessary for uniform flow with a depth of flow of 300 mm. Also find the conveyance K of the flume [6]

(OR)

5. a) Derive an expression for the discharge through a channel by Chezy's formula. [6]
   b) A rectangular channel 4 m wide has depth of water 1.5 m. The slope of the bed of the channel is 1 in 1000 and value of Chezy's constant C = 55. It is desired to increase the discharge to a maximum by changing the dimensions of the section for constant area cross-section, slope of the bed and roughness of the channel. Find the new dimensions of the channel and increase in discharge. [6]

UNIT-III

6. a) Prove that the force exerted by a jet of water on a fixed semi-circular plate in the direction of the jet when the jet strikes at the centre of the semi-circular plate is two times the force exerted by the jet on an fixed vertical plate. [6]

   b) Water is flowing through a pipe at the end of which a nozzle is fitted. The diameter of the nozzle is 100 mm and the head of water at the centre nozzle is 100 m. Find the force exerted by the jet of water on a fixed vertical plate. The coefficient of velocity is given as 0.95. [6]

(OR)

7. a) Show that for a curved radial vane, work done per second is given by, $\rho a V_1[V_{w1}u_1 \pm V_{w2}u_2]$ [4]

   b) A jet of water having a velocity of 20 m/s strikes a curved vane, which is moving with a velocity of 10 m/s. The jet makes an angle of 20^0 with the direction of motion of vane at inlet and leaves at an angle of 130^0 to the direction of motion of vane at outlet. Calculate [8]
   i. vane angles, so that the water enters and leaves the vane without shock.
   ii. work done per second per unit weight of water striking the vane.

UNIT-IV

8. a) What is meant by turbine and give the classification in detail. [6]

   b) Explain the working nature of Pelton wheel turbine with neat sketch. [6]

(OR)

9. a) Obtain an expression for unit speed, unit discharge and unit power of a turbine. [4]

   b) A Kaplan turbine working under a head of 15 m develops 7357.5 kW shaft power. The outer diameter of the runner is 4m and the hub diameter is 2 m. The guide blade angle at the extreme edge of the runner is 30^0. The hydraulic and overall efficiencies of the turbine are 90% and 85% respectively. If the velocity of whirl is zero at outlet, determine: [8]
   i. runner vane angles at inlet and outlet at the extreme edge of the runner
   ii. speed of turbine

UNIT-V

10. a) Define a centrifugal pump. Explain the working of a single-stage centrifugal pump with sketch. [4]

    b) Explain characteristic curves of centrifugal pump. [8]

(OR)

11. a) Define specific speed of a centrifugal pump. Derive the expression for the same. [4]

    b) The diameter of an impeller of a centrifugal pump at inlet and outlet are 300 mm and 600 mm respectively. The velocity of flow at outlet is 2.5 m/s and vanes are set back at an angle of 45^0 at outlet. Determine the minimum starting speed of the pump if the manometric efficiency is 75%. [8]

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AR13

CODE: 13EE2011 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, October / November-2020
ELECTRICAL MACHINES – II
(Electrical and Electronics Engineering)

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

PART-A

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

1. a) Why is the Transformer core laminated?
   b) Define All day efficiency.
   c) Mention the parts where stray load losses occur in a Transformer.
   d) Sketch the equivalent circuit of a auto transformer.
   e) Draw the power flow diagram of induction motor.
   f) Determine synchronous speed.
   g) What are the methods of starting induction motors.
   h) Determine Crawling.
   i) What are the limitations of induction generators?
   j) Draw the torque-speed characteristics of Induction generators.

PART-B

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

UNIT-I

2. a) What are the effect of variations of frequency & supply voltage on iron losses — 5M
   b) A single phase 100KVA, 2000/200V, 50Hz transformer has an impedance drop of 10% and resistance drop of 5%. Calculate the (i) regulation at full load 0.8 pf lag (ii) the value of the power factor at which the regulation is zero. — 7M

(OR)

3. a) Describe the principle of operation of a Transformer. — 5M
   b) Discuss the e.m.f equation of a Transformer. — 7M

UNIT-II

4. a) Describe the separation of eddy current and hysteresis losses — 5M
   b) A 20 KVA, 2500/250V, 50Hz, single phase transformer gave the following test result: — 7M
   OC test(LV side): 250V, 1.4A,105W
   SC test(HV side): 104V,8A,320W.
   Compute the parameters of the approximate equivalent circuit referred to high voltage and low voltage sides. Also draw the exact equivalent circuit referred to the low voltage side.

(OR)

5 Briefly explain about scott connection along with phasor diagrams. What are the applications of scott connection of transformer? — 12M

UNIT-III

6. a) A three-phase, 50Hz, 4-pole induction motor has a slip of 4%.Calculte (a) speed of the motor (b) frequency of rotor emf .If the rotor has a resistance of 1 ohm and standstill reactance of 4 ohm. Calculate the power factor (i) at stand still, and (ii) at a speed of 1400 RPM. 7M

   b) Develop the relationship between rotor copper loss and rotor input. 5M

(OR)

7. a) A 500V, 6-pole , 50Hz, three-phase induction motor develops 20KW inclusive of all mechanical losses when running at 995 RPM, the pf being 0.87. Calculate (i) the rotor copper losses (ii) the total input if the stator loss is 1500W,(iii) line current (iv) the rotor current frequency. 7M

   b) Explain the schematic diagrams of torque-speed and torque-slip characteristics. 5M

UNIT-IV

8 Draw the circle diagram of a 15 h.p , 230V,50Hz ,three-phase slip ring induction motor with a star connected stator and rotor. The winding ratio is unity. The stator resistance is 0.42 ohm/phase and rotor resistance is 0.3 ohm/phase. The following are the test readings. 12M

No-load test: 230V, 9A, 0.2143pf. Short circuit test: 115V, 45A, 0.454pf.

Find

(a) starting torque (b) maximum torque

(c) maximum power factor (d) slip for maximum torque

(e) Maximum output.

(OR)

9. a) Explain the Auto-transformer starter with a neat sketch. 6M

   b) A cage induction motor when started by means of a star-delta starter takes 180% of full load line current and develops 35% of full load torque at starting. Calculate the starting torque and current in terms of full load values, if an auto transformer with 75% tapping were employed. 6M

UNIT-V

10 Explain various speed control methods of three-phase induction motors. 12M

(OR)

11. a) Explain the concept of injecting emf into the rotor circuit. 6M

    b) Illustrate how the speed of induction motor controlled by varying the stator voltage. 6M

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AR13

Code: 13ME2011 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, October / November-2020

THERMAL ENGINEERING - I
(Mechanical Engineering)

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

PART-A

Answer all questions **[1 X 10 = 10 M]**

1 a) What do you mean by stoichiometric mixture?
b) What do you mean by firing order?
c) What do you mean by pre-ignition?
d) What is meant by delay period.?
e) Define performance number.
f) Define Cetane number.
g) Define indicated power.
h) Define choking.
i) Define stalling.
j) Explain the principle of carburetion

. **PART B**

Answer one question from each unit **[5 X 12=60M]**

UNIT -I

2.a) Briefly explain the following a) time loss factor b) heat loss factor 6**M**
b) Describe essential parts of a modern carburetor 6**M**

(OR)

3.a) Explain with neat sketch thermostat cooling system. **6M**
b) Discuss briefly the loss due to gas exchange process. **6M**

UNIT -II

4.a) Explain the phenomenon of knock in SI engine. 6**M**
b) Explain different combustion chambers for SI engines. 6**M**

(OR)

5.a) Explain the effect of various engine variables on SI engine knock. **6M**
b) Briefly explain the turbulence in S.I engines. **6M**

UNIT -III

6.a) Explain the various stages of combustion in CI engine. **6M**
b) Explain swirl combustion chamber. **6M**

(OR)

7.a) Explain the factors that effect the delay period. **6M**
b) Explain pre-combustion chamber. **6M**

AR13

Code: 13ME2011 **SET-2**

UNIT -IV

8. An eight cylinder, four stroke engine,of 9 cm bore and 8 cm stroke with a compression ratio of 7 is tested at 4500 rpm on a dynamometer which has 54cm arm. During a 10 minutes test the dynamometer scale beam reading was 42 kg and the engine consumed 4.4 kg of gasoline having a calorific value of 44000 kJ/kg. Air 27^0C and 1 bar was supplied to the carburettor at the rate of 6 kg/min. Find i) the brake power delivered ii) the brake mean effective pressure iii) the break specific fuel consumption iv) the brake specific air consumption v) the brake thermal efficiency vi) the volumetric efficiency vii) the air-fuel ratio. **12M**

(OR)

9. The following observations were made during test of single cylinder , four stroke cycle gas engine having a cylinder diameter of 18 cm and stroke 24 cm.

Duration of trial = 30 min
Total number of revolutions = 9000
Total number of explosions = 4450
Net load on the brake = 40kg
Mean effective pressure = 5 bar
Volume of gas used = 2.4 m^3
Pressure of air =720 mm Hg
Room temperature = 17^0 C
Calorific value of gas = 19 MJ/m^3 at NTP
Rise in temperature of jacket cooling water =30^0 C
Cooling water circulated = 80 kg
Effective diameter of brake wheel = 1m
Total air used = 36 m^3
Temperature of exhaust gas = 350^0 C
Specific heat of exhaust gas = 1 kJ/kg K

Draw up a heat balance sheet and estimate the indicated thermal efficiency and mechanical efficiency. Take R = 287 J/kg K. **12M**

UNIT -V

10.a) Explain with neat sketch the working of root blower compressor. **5M**

b) A single-stage single-acting air compressor delivers 0.6 kg of air per minute at 6 bar. The temperature and pressure at the end of suction stroke are 30^0 C and 1 bar. The bore and stroke of the compressor are 100mm and 150mm respectively. The clearance is 3% of the swept volume. Assuming the index of compression and expansion to be 1.3, find:

i) Volumetric efficiency of the compressor,
ii) Power required if the mechanical efficiency is 85%
iii) Speed of the compressor(r.p.m) **7M**

(OR)

11.Explain with a neat diagram a) Axial flow air compressor b) Reciprocating air compressor. **12M**

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AR13

CODE: 13EE2013 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, October / November-2020

LINEAR CONTROL SYSTEMS
(Electronics and Communication Engineering)

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

PART-A

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

1. a) Draw the block diagram of a human being as a closed-loop control system.
   b) Draw the block diagram which represents the basic elements of a feedback control system.
   c) Draw the time response of second order system and represent the time domain specifications on it.
   d) What is a synchro? Write its transfer function.
   e) What are the limitations of Routh Criterion?
   f) What is the effect of addition of pole to a transfer function on Root Locus?
   g) What are the specifications in frequency domain?
   h) Define phase margin and gain margin.
   i) What are the properties of state transition matrix?
   j) Write the differences between lag and lead compensator.

PART-B

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

UNIT-I

2. Explain the effects of feedback system. 12M

(OR)

3. Describe the types of control systems 12M

UNIT-II

4. a) Derive the expressions for peak time and settling time of a standard second order under damped system. 6M
   b) A unity feedback system has an open-loop transfer function $G(S) = \frac{K}{S(S+10)}$. Determine K so that the system will have a damping ratio 0.5. For this value of K, determine peak over shoot and time for peak over shoot for the unit step input. 6M

(OR)

5. a) What is meant by step, ramp, parabolic and impulse inputs. 4M
   b) Derive the time response of under damped system. 8M

UNIT-III

6. The open loop transfer function of a unity feedback control system is given by $G(S) = K/\{S(S+1)(S+5)\}$. Sketch the root locus plot of the closed loop system. 12M

(OR)

7. a) Explain the special cases in Rouths stability criterion. 4M
   b) Sketch the root locus for the characteristic equation is. 8M
   s (s+1) (s+2) + k (s + 1.5) = 0

UNIT-IV

8. Determine the value of the gain constant K for the system with open loop transfer function $G(S) = \frac{K}{S(1+0.2S)(1+0.01S)}$. So that it has a phase margin of about 35^0 . For this value of K, find the new gain margin. 12M

(OR)

9. Given the open loop transfer function with unity feedback as
   $G(S) = \frac{100}{S(1+0.1S)(1+0.01S)}$. Draw the bode plot. 12M

UNIT-V

10. a) Define the term state variable. What are the advantages of state space representation? 4M
    b) Obtain a state model for the system described by
    $T(S) = \frac{Y(S)}{U(S)} = \frac{8}{S^3 + 6S^2 + 11S + 9}$ 8M

(OR)

11. a) Discuss the concept of controllability and observability with an example. 3M
    b) Given the state equation $\dot{X} = AX$, Where $\mathbf{A} = \begin{bmatrix} -3 & 1 & 0 \\ 0 & -3 & 1 \\ 0 & 0 & -2 \end{bmatrix}$. Determine the state transition matrix. 9M

AR13

CODE: 13CS2005 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, October / November-2020
SOFTWARE ENGINEERING
(Common to CSE & IT)

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

PART-A

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

1. a) What is software engineering
   b) What is CMMI?
   c) State functional requirements
   d) What are data models
   e) What is Object-Oriented design process
   f) What is software architecture
   g) Explain Validation testing
   h) What is COCOMO Model
   i) Define risk projection
   j) What is ISO 9000 quality standards

PART-B

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

UNIT-I

2. a) Discuss waterfall model 6M
   b) Explain incremental process model 6M

(OR)

3. Define software engineering and Give a generic view of Software Engineering. [12M

UNIT-II

4. a) What are user requirements 6M
   b) Discuss system requirements 6M

(OR)

5. a) Explain Behavioural models 6M
   b) What are Context Models 6M

UNIT-III

6. a) Explain Architectural styles and patterns 6M
   b) Discuss about Design process 6M

(OR)

7. a) What is design evaluation 6M
   b) Explain Interface design steps 6M

UNIT-IV

8. Explain Software Cost Estimation models 12M

(OR)

9. a) Discuss about black box testing 6M
   b) Explain White-Box testing 6M

UNIT-V

10. a) Explain Formal Technical reviews in quality management 6M
    b) Discuss about Software quality assurance in quality management 6M

(OR)

11. a) Compare Reactive vs. Proactive Risk strategies 6M
    b) Explain Risk identification 6M