AR13

CODE: 13CE2007 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular / Supplementary Examinations, April-2017

HYDRAULICS AND HYDRAULIC MACHINERY
(Civil Engineering)

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

PART-A

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

1. Explain the following briefly
   a) Dimensional homogeneity
   b) Buckingham π method
   c) Momentum correction factor
   d) Direct step method
   e) Hydrodynamic force
   f) Principles of angular momentum
   g) Applications of hydraulic turbines
   h) Unit speed
   i) Work done by centrifugal pump
   j) Specific speed

PART-B

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

UNIT-I

2. For laminar flow in a pipe the drop in pressure p is a function of pipe length 1, its diameter d, mean velocity of flow v, and viscosity of fluid μ. Using Rayleigh's method obtain an expression for p **12 M**

(OR)

3. a) What are similarity laws? **3 M**
   b) What is meant by dimensional analysis? What are the uses? **9 M**

UNIT-II

4. A rectangular channel which is laid on a bottom slope of 0.0064 is to carry 20 m^3/s of water. Determine the width of the channel when the flow is in critical condition. Take Manning's n = 0.015 **12 M**

(OR)

5. What is meant by G.V.F. Derive the equation of G.V.F in terms of Froude number **12 M**

UNIT-III

6. a) Derive an expression for force exerted by a jet on moving inclined plate? **6 M**
   b) A nozzle of 50 mm diameter delivers a stream of water at 20 m/s perpendicular to a plate that moves away from the jet at 5 m/s. find: **6 M**
   i) Force exerted by the jet on plate in the direction of motion
   ii) Force exerted by the jet on the plate in perpendicular to the direction of motion

(OR)

7.		A rectangular plate weighing 60N is suspended vertically by a hinge on the top horizontal edge. The centre of gravity of the plate is 100mm from the hinge. A horizontal jet of water of 25mm diameter whose axis is 150 mm below the hinge, impinges normally to the plate with a velocity of 6m/s. Find the horizontal force applied at the centre of gravity to maintain the late in vertical position, the change in velocity of jet if the plate is deflected through 30° and the same horizontal force continues to act at the centre of gravity of the plate. 26.49 N and 2.48 m/s	**6 M**

UNIT-IV

8.	a)	What is a turbine and give the classification in detail?	**6 M**
	b)	Explain the working of Pelton wheel with a neat sketch.	**6 M**
		(OR)	
9.	a)	List out the various components of a hydro electric power plant.	**4 M**
	b)	How do you estimate water power potential in Francis and Kaplan turbines?	**8 M**

UNIT-V

10.	a)	Explain about the characteristic curves of centrifugal pump.	**8 M**
	b)	The internal and external diameter of the impeller by centrifugal pump are 200 mm and 400 mm respectively, the pump is running at 1200 rpm. The vane angles of impeller at the inlet and outlet are 20^0 and 30^0 resp., the water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water.	**4 M**
		(OR)	
11.		The impeller of a centrifugal pump having external and internal diameters 500mm and 250 mm respectively, width of outlet 50mm and running at 1200 rpm works against a head of 48m. The velocity of flow through the impeller is constant and is equal to 3 m/s. The vanes are back at an angle of 40° at the outlet. Determine inlet vane angle, work done by the impeller on water per second and manometric efficiency.	**12 M**

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AR13

CODE: 13EE2011 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Regular / Supplementary Examinations, April-2017

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) What is magnetizing component of current in a transformer.
   b) What is an ideal transformer?
   c) What is the condition for zero voltage regulation in a single phase transformer?
   d) What is the speed of rotor rotating magnetic field with respect to stator frame?
   e) Draw the torque slip characteristics of three phase induction motor?
   f) What is the frequency of rotor currents induced?
   g) What is deep bar rotor of induction motor.
   h) Mention the starting methods which can be employed for only slip ring induction motors.
   i) What is constant flux method of speed control in induction motor.
   j) What are the applications of induction generator.

PART-B

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

UNIT-I

2. **a)** Explain the basic working principle of transformer. **[5M]**

   b) Explain the operation of transformer on no load and load conditions. **[7M]**

(OR)

3. **a)** Explain various losses taking place in transformer and also how these losses vary with the load. **[6M]**

   b) A 20 KVA, 2200/200 V, single phase,50 Hz transformer has a primary resistance of 2.5 Ω and reactance of 4.8 Ω. The secondary resistance and reactance are 0.01Ω and 0.018 Ω respectively. Find **[6M]**
   (i) Equivalent resistance, reactance & impedance referred to primary
   (ii) Equivalent resistance, reactance & impedance referred to secondary
   (iii) Total copper loss of transformer

UNIT-II

4. **a)** With neat diagram explain the experimental set up required for the conduct of Sumpners test on two similar transformers. **[6M]**

   b) Draw the equivalent circuits of auto transformer in step down mode & step up mode **[6M]**

(OR)

5. **a)** Explain about OFF-load and ON –load tap changers. **[6M]**

b) A Delta/star,33KV/6.6KV,2000 KVA, 3Φ transformer has stator resistance/phase=8Ω, Rotor resistance=0.08%, Rotor impedance =7%. Calculate secondary load voltage & regulation at 0.75 p.f. lag. **[6M]**

UNIT-III

6. **a)** Explain how the RMF is produced in three phase induction motor. And also explain how the RMF and rotor rotates in same direction. **[6M]**

b) A 3Φ Induction motor operates from a supply whose frequency is 50 Hz and rotates at a speed of 1485 RPM at no load & 1350 RPM at full load. Calculate (i) speed at which the magnetic field of stator is rotating (ii) slip at no load & at full load (iii) frequency of the rotor current at no load & at full load (iv) frequency of rotor current at stand still. **[6M]**

(OR)

7. a) Explain the principle of double cage rotor. **[4M]**

b) Explain various losses taking place in three phase induction motor. And also prove Power input to rotor : mechanical power developed by rotor : rotor copper loss =1: (1-S) : S **[8M]**

UNIT-IV

8. Draw the circle diagram for 3-phase, 6-pole, 50HZ, 400V, star connected induction motor from the following data (line values) **[12M]**

No-load test: 400V, 11A, p.f.=0.2

Short circuit test: 100V, 25A, p.f. =0.4

The rotor Copper loss at standstill is 60% of the total copper losses and full load current is 20A.From the circle diagram determine:

(i) Power factor (ii) slip (iii) output (iv) efficiency

(v) speed (vi) maximum power output (vii) maximum power input.

(OR)

9. **a)** With the help of wiring diagram explain briefly auto transformer starter of three phase induction motor. **[7M]**

b) A 50KVA, 400V, 50 Hz squirrel cage induction motor has full load slip of 5%.Its standstill impedance is 0.866Ω/ph. Motor is started using auto transformer starting.If the maximum allowable supply current at the time of starting is 100A, Calculate the tap position and the ratio of starting torque to full load torque. **[5M]**

UNIT-V

10. **a)** Explain cascaded connection method for speed control of three-phase induction motor. **[6M]**

b) A cascade set consists of two motors A and B with 4 poles and 6 poles respectively. The motor is connected to a 50 Hz supply. Find (i) speed of set (ii) electric power transferred to generator B when the input to motor A is 25 KW. Neglect losses. **[6M]**

(OR)

11. **a)** What are the various methods of speed control on rotor side of a three induction motor? and explain any one of them in detail. **[7M]**

b) Explain the principle of operation of three phase induction generator. **[5M]**

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CODE: 13ME2010 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular / Supplementary Examinations, April-2017
DESIGN OF MACHINE MEMBERS - I
(Mechanical Engineering)

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

PART-A

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

1. a) What do you understand by preferred numbers?
   b) Differentiate Brittle fracture from ductile fracture.
   c) List the important factors that influence the magnitude of factor of safety.
   d) What is meant by 'stress concentration'?
   e) Write down the Soderberg equation for fatigue.
   f) What are the assumptions made in the design of welded joint?
   g) Draw a sketch of triple riveted double cover butt joint with zig-zag type of riveting.
   h) What are the different types of bolted joints?
   i) Explain the reasons for preferring hollow shafts over solid shafts.
   j) List any two applications of helical torsional springs.

PART-B

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

UNIT-I

2. a) Explain the manufacturing considerations in design. **4M**
   b) A transmission shaft of cold drawn steel 27Mn2 (S_{ut} = 500 N/mm^2 and S_{yt} = 30 N/mm^2) is subjected to a fluctuating torque which varies from -100 N-m to +300 N-m. The factor of safety is 2 and the expected reliability is 0%. Neglecting the effect of stress concentration, determine the diameter of the shaft. Assume the distortion energy theory of failure. **8M**

(OR)

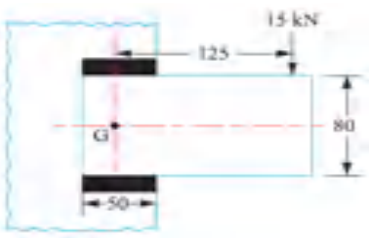
3. a) Draw S-N curve for mild steel and explain its significance. **4M**
   b) Explain the various theories of failure for design of machine components. **8M**

UNIT-II

4. Design a triple riveted longitudinal double strap butt joint with unequal straps for a boiler. The inside diameter of the drum is 1.5 meters. The joint is to be designed for a steam pressure of 2.4 N/mm^2 . The working stresses to be used are σ_t = 77N/mm^2 , τ = 62 N/mm^2 ; σ_c=120 N/mm^2 . Assume the efficiency of the joint as 75%. **12M**

(OR)

5. a) How the strength of transverse fillet weld is evaluated? **4M**
   b) A bracket carrying a load of 15 KN is to be welded as shown in fig. Find the size of the weld required if the allowable shear stress is not to exceed 100 Mpa. **8M**



UNIT-III

6.	a)	How do you obtain a bolt of uniform strength?	**4M**
	b)	Discuss the advantages and disadvantages of riveted, bolted and welded joints.	**8M**

(OR)

7.	a)	Define the terms: i) Hoop stress and ii) Longitudinal stress	**4M**
	b)	A cast iron cylinder of internal diameter 200 mm and thickness 50 mm is subjected to a pressure of 10 N/mm^2. Calculate the tangential and radial stresses at the inner, middle (radius = 125 mm) and outer surfaces.	**8M**

UNIT-IV

8.		Design a cotter joint to connect two mild steel rods for a pull of 25 kN. The maximum permissible stresses are 55N/mm^2 in tension, 40N/mm^2 in shear and 70 N/mm^2 in crushing. Draw a neat sketch of the joint.	**12M**

(OR)

9**.**	a)	Find the diameter of shaft required to transmit 50 kW at 150 rpm if the maximum torque is likely to exceed the mean torque by 25% for a maximum permissible torsional shear stress of 60 N/mm^2 . Also find the angle of twist for a length of 2.5 meters. Take G = 80 GPa.	**6M**
	b)	Explain briefly about the design of shafts subjected to combined bending and torsion.	**6M**

UNIT-V

10.	a)	Explain types of couplings.	**4M**
	b)	Design a Muff coupling which is used to connect two steel shafts transmitting 40 KW at 350 rpm. The material for the shaft and key is plain carbon steel for which allowable shear and crushing stresses may be taken as 40MPa and 80MPa respectively. The material for the muff is cast iron for which the allowable shear stress may be assumed as 15MPa.	**8M**

(OR)

11.		A helical compression spring made of oil tempered carbon steel, is subjected to a load which varies from 400 N to 1200 N. The spring index is 6 and the design factor of safety is 1.25.If the yield stress in shear is 770 MPa and endurance stress in shear is 350MPa. Find: 1) Size of the spring wire 2) Diameters of the spring 3) Number of turns of the spring and 4) Free length of the spring. The compression of the spring at the maximum load is 25 mm. The modulus of rigidity for the spring material may be taken as 80 kN/mm^2.	**12M**

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AR13

CODE: 13EC2011 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular / Supplementary Examinations, April-2017

ELECTROMAGNETIC WAVES AND TRANSMISSION LINES
(Electronics and Communication Engineering)

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

PART-A

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

1. a) State and explain Columb's law.
   b) Define electric flux density.
   c) Explain displacement current density and mention its units
   d) Distinguish between spherical and plane electromagnetic wave.
   e) Explain vector magnetic potential.
   f) Explain Polarization in dielectric material.
   g) State and explain Pointing vector.
   h) What is the significance of intrinsic impedance of free space? What is its value?
   i) What is Brewster angle?
   j) Explain Characteristic impedance in transmission lines and mention its significance.

PART-B

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

UNIT-I

2 a) State and explain Gauss law. Explain any two applications. **6M**
   b) Given that $D = z\rho \cos^2 \varphi \, a_z \, C/m^2$, Calculate the charge density at (1, π/4,3) and the total charge enclosed by the cylinder of radius 1 m with $-2 \leq z \leq 2m$. **6M**

(OR)

3 a) Derive an expression for capacitance of the spherical capacitor. **6M**
   b) Two point charges -4 μC and 5 μC are located at (2, -1, 3) and (0, 4, -2), respectively. Find the potential at (1,0,1) assuming zero potential at infinity. **6M**

UNIT-II

4. a) Determine the magnetic field due to a *straight* current carrying filamentary conductor of finite length *AB*. **6M**
   b) A circular loop located on $x^2 + y^2 = 9$, z=0 Carries a direct current of 10 A along a_φ. Determine H at (0,0,4) and (0,0, -4). **6M**

(OR)

5. a) Derive an expression for force between two straight long and parallel current carrying conductors. **6M**
   b) Derive an expression for the magnetic field intensity '**H**' using Biot-Savarts law for an current element **6M**

UNIT-III

6 a) What is the Faraday's law of induction and derive an expression in point form Explain the significance of the terms transformer e.m.f and generator e.m.f. **6M**

b) Two extensive homogeneous isotropic dielectrics meet on plane z = 0. For $z \geq 0$, $\varepsilon_{r1} = 4$ and for $z \leq 0$, $\varepsilon_{r2} = 3$. A uniform electric field $E_1 = 5\ a_x - 2\ a_y + 3\ a_z$ k V/m exists for $z \geq 0$. Find **6M**

(a) E_2 for $z \leq 0$

(b) The angles E_1 and E_2 make with the interface

(OR)

7 a) Describe the concept of displacement current with suitable example and derive the Maxwell's equation which incorporates the displacement current. **6M**

b) Derive the boundary conditions for Magnetic field **6M**

(i) Dielectric- Dielectric interface

(ii) Dielectric- Conductor interface

UNIT-IV

8. a) Derive wave equation for source free regions from Maxwell's equation. **6M**

b) For a conducting medium derive expressions for α and β. **6M**

(OR)

9. a) Derive expression for reflection and transmission coefficients of an EM wave when it is incident normally on a dielectric. **6M**

b) Define uniform plane wave. Prove that uniform plane wave does not have field components in the direction of propagation. **6M**

UNIT-V

10. a) Derive the propagation constant for transmission lines. **6M**

b) Explain the conditions which are used for minimum attenuation and distortion in transmission lines. **6M**

(OR)

11. a) Derive the expression for the input impedance of a loss-less line. Hence evaluate Z_{OC} and Z_{SC} and sketch their variation with line length. **6M**

b) Explain the significance and design of single stub impedance matching. Discuss the factors on which stub length depends. **6M**

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AR13

CODE: 13CS2008 SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular / Supplementary Examinations, April-2017

COMPUTER ORGANIZATION AND ARCHITECTURE
(Common to CSE & IT)

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

PART-A

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

1. a) What is register transfer language
   b) Define parallelism in microinstruction
   c) Write the multiply rule for floating point numbers
   d) What are the various ways of representing signed integers in the system
   e) What is the mapping procedures adopted in the organization of a cache Memory
   f) What is meant by memory interleaving
   g) State the differences between memory mapped I/O and I/O mapped I/O
   h) What is a priority interrupt
   i) What are the types of pipeline hazards?
   j) What is arbitration procedure

PART-B

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

UNIT-I

2.	a)	What are the advantages of multiple bus organization over a single bus organization	**6 M**
	b)	Write IEEE standard for floating point representation	**6 M**
		(OR)	
3.	a)	Explain the error detection method and give one example	**6 M**
	b)	Describe how the floating-point numbers are represented and used in digital arithmetic operations. Give an example.	**6 M**

UNIT-II

4.	a)	Give the block diagram of the hardware implementation of addition and subtraction of signed number and explain its operations.	**8 M**
	b)	Explain briefly about stack organization.	**4 M**
		(OR)	
5.		Explain various addressing modes found in modern processor.	**12 M**

UNIT-III

.6.	a)	Explain the concept of virtual memory with any one virtual memory Management technique.	**8 M**
	b)	Write about auxiliary memory	**4 M**
		(OR)	
7.	a)	Explain the organization of magnetic disk and magnetic tape in detail.	**6 M**
	b)	Discuss the various mapping techniques used in cache memories.	**6 M**

AR13

CODE: 13CS2008 SET-2

UNIT-IV

8.	a)	What is the importance of I/O interface? Explain the block diagram of I/O interface	**6 M**
	b)	Explain various data transfer modes used in DMA	**6 M**
		(OR)	
9.		Explain the use of vectored interrupts in processes. Why is priority handling desired in interrupt controllers? How does the different priority scheme work.	**12 M**

UNIT-V

10.	a)	Explain the basic concepts of pipelining and compare it with sequence processing with a neat diagram.	**8 M**
	b)	What are the trends in computer architecture	**4 M**
		(OR)	
11.		Explain in detail about instruction execution characteristics.	**12 M**

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