

Code: 13CE2007

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.TECH II SEM END EXAMINATIONS, JULY, 2015

HYDRAULICS AND HYDRAULIC MACHINERY
(CIVIL ENGINEERING)

Time: 3 Hours

Max Marks: 70

PART-A

Answer all questions

[1 X 10 = 10M]

1.
 - a) What do you understand by fundamental units and derived units?
 - b) Explain the term 'dimensional homogeneity equation'.
 - c) Differentiate between Prismatic and Non-Prismatic channels
 - d) List the factors that affect Manning's rugosity coefficient
 - e) Write the equation for force when a jet strikes the movable incline flat plate vane. State clearly the variables used.
 - f) Differentiate between impulse turbine and reaction turbine.
 - g) Write two important functions of draft tube.
 - h) Explain the process of priming in the pump.
 - i) Distinguish between suction head and delivery head
 - j) What is cavitation?

PART-B

Answer one question from each unit

[5 X 12 = 60 M]

UNIT-1

2. The pressure rise Δp generated by a pump is a function of the impeller diameter D , the rotational speed N , the fluid density ρ , viscosity μ and rate of discharge Q .
Show that $\Delta p = \rho N^2 D^2 \phi\left(\frac{Q}{ND^2}, \frac{\rho N D^2}{\mu}\right)$

(OR)

3.
 - a) Explain Rayleigh's method of obtaining relation between a given set of variables influencing a phenomenon
 - b) A partially submerged body is towed in water. The resistance R to its motion depends on the density, viscosity μ of water, length L of body, velocity v of body and the acceleration due to gravity g . Show that the resistance to the motion can be expressed in the form.

Code: 13CE2007**UNIT-II**

4. a) Derive Chezy's equation for uniform flow in open channel and state assumptions made
b) A trapezoidal channel carries a discharge of $28.5 \text{ m}^3/\text{s}$ with a mean velocity of 1.5 m/s when lined with rubble masonry $N=0.017$ one side is vertical and the other has a slope of 2H:IV. Determine the minimum slope and dimensions of the channel.

(OR)

5. a) Derive the dynamic equation for gradually varied flow stating the assumptions made.
b) A sluice gate discharges water into a horizontal rectangular channel with velocity of 10 m/sec and depth of flow of 1 m . Determine i). The depth of flow water after the jump ii). Length of channel.

UNIT-III

6. a) Prove that the force exerted by a jet of water on a fixed semi-circular in the direction of the jet when the jet strikes the center of the semi-circular plate is two times the force exerted by the jet on a fixed.
b) An experiment was conducted on Impact of Jet in the Hydraulics and Hydraulic Machinery Laboratory and the following values were observed.
i. Diameter of Pipe is 40 cm
ii. Diameter of Jet is 7.5 cm
iii. Velocity of Jet is 20 m/sec .

Conditions: I. Plate is at rest. II. Plate is moving in the same direction of flow with velocity 5 m/sec . Based on the observations find out the thrust and work done/sec for condition i & ii. And also calculate the efficiency of the jet for condition ii.

(OR)

7. a) Obtain the expression force exerted by a jet of water on fixed vertical plate and movable inclined plate.
b) Water is flowing through a pipe at the end of which a nozzle is fitted. The diameter of the nozzle is 120 mm and head of water at the center 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

UNIT-IV

8. a) Describe briefly the function of various main components of Pelton turbine with neat sketch.
b) Classify the turbines based on head, specific speed and hydraulic actions. Give examples for each.

AR13**SET-1****Code: 13CE2007****(OR)**

9. a) A conical draft tube having inlet and outlet diameter 1.5m and 2m discharges water at outlet with a velocity of 2.5 m/s. The total length of the draft tube is 6m and 1.2m of the length of draft tube is immersed in water. If atmospheric pressure head is 10.3m of water and loss of head due to friction in the draft tube is equal to 2 times the velocity head at the outlet of the tube. Find (i). Pressure head at inlet and (ii). Efficiency of the draft tube.
- b) What do you understand by Specific speed of a turbine and derive the expression for the same

UNIT-V

10. a) A three stage centrifugal pump has impeller 40 cm in diameter and in diameter and 2.5 cm wide at outlet. The vanes are curved back at the outlet at 30° and reduce the circumferential area by 15%. The manometer efficiency is 85% and overall efficiency is 75%. Determine the head generated by the pump when running at 12000 rpm. And discharge is $0.06 \text{ m}^3 / \text{sec}$. Find the shaft power also.
- b) Draw the neat sketch of multistage Centrifugal pumps and explain their applications.

(OR)

11. a) Draw the velocity triangles for centrifugal pump and derive an equation for the manometric head and efficiency
- b) What do you understand by the characteristics of curves of pump? What is the significance of characteristics of curves?

Code: 13EE2011**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.TECH II SEM END EXAMINATIONS, JULY, 2015****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) In a Transformer, why is the low-voltage winding placed near the core?
b) What is an ideal transformer?
c) List out various losses in a transformer?
d) Define all day efficiency of transformer?
e) A six pole, 60Hz induction motor stator field rotates at what speed?
f) Define slip?
g) What are the different methods of speed control of a three-phase induction motor?
h) What are the different losses of an induction motor?
i) What is the condition for maximum torque developed in an induction motor?
j) Name the tests required to draw circle diagram?

PART-B**Answer one question from each unit****[5 X 12=60M]****UNIT-I**

2. Define voltage regulation of a transformer. Discuss constructional details of single phase transformer. [12M]

(OR)

3. a) Draw and explain the phasor diagram of a single phase transformer under lagging p.f load? [6M]
b) A 10KVA single phase transformer has a core loss of 50W and full load ohmic loss of 120W. the daily variation of load on the transformer is as follows: [6M]
6a.m to 12 noon : 5KW at 0.7 p.f
12 noon to 6p.m : 4KW at 0.8 p.f
6p.m to 1a.m : 8KW at 0.9 p.f
1a.m to 7 a.m : No-load
Find all day efficiency.

UNIT-II

4. a) What are the conditions for parallel operation of transformer. [4M]
b) A 8KVA, 440/2000V, 50Hz single phase transformer gave the following test results:
No-load test : 440V, 0.8A, 80W
Short circuit test : 50V, 3A, 20W.
Calculate the efficiency and voltage regulation at full load 0.85 p.f lagging. [8M]

(OR)

5. a) Explain with the help of neat diagram the operation of on load tap changer of a transformer [5M]
b) A 3-phase Y/ transformer of rating 225/24KV, 400MVA has a series reactance of 11.7 referred to its high voltage side. The transformer is supplying a load of 325MVA with 0.93 p.f lagging at a voltage of 24KV (line-to-line) on its low voltage side. It is supplied from a feeder whose impedance is $0.11 + j2.2$ connected to its high-voltage side. Determine the line-to-line voltage at the high voltage side of the transformer and line-to-line voltage at the sending end of the feeder. [7M]

UNIT-III

6. a) Explain the principle of operation of a 3-phase induction motor. [6M]
b) A 6-pole, 50Hz, 3-phase induction motor has a rotor resistance of 0.25 Ω per phase and maximum torque of 10 N-m at 875 rpm. Calculate [6M]
i) The torque when the slip is 5%
ii) The resistance to be added to the rotor circuit to obtain 60% of the maximum torque at starting.

(OR)

7. a) Explain what is meant by stand still reactance of induction motor rotor. [4M]
How does it vary with speed?
b) The slip ring rotor resistance and stand still reactance per phase of a 3300V, 24-pole, 50Hz, 3-phase star connected induction motor is 0.02 Ω and 0.03 Ω respectively. Calculate
i) The speed at maximum torque
ii) Ratio of full load torque to maximum torque of full load torque is obtained at 246 r.p.m. [8M]

UNIT-IV

8. A 3-phase, 5hp (3.7KW), 50Hz 4 pole star connected induction motor has the following test results
No-load : 200V, 350W, 5A
Short circuit: 100V, 1700W, 26A
Draw the circle diagram for full load condition, the line current power factor and maximum torque in terms of full load torque. Rotor copper loss at stand still is half the total copper loss. [12M]

(OR)

9. a) Why are starters needed for starting 3-phase induction motors? [4M]
b) A three-phase 6-pole 50Hz induction motor takes 60 amps at full load speed of 940rpm develops a torque of 150N-m. The starting current at rated voltage is 300 amp. What is starting torque? If a star-delta starter is used to determine the starting torque and starting current. [8M]

UNIT-V

10. a) Discuss the methods of speed control by change of slip. [5M]
b) A 4-pole induction motor and 6-pole induction motor are connected in cumulative cascade at 50Hz supply. The frequency in the secondary circuit of the 6-pole motor is observed to be 1.0Hz. Determine the slip in each machine and combined speed of the set. [7M]

(OR)

11. What is induction generator? Discuss the principle of operation of an induction generator. [12M]

CODE: 13ME2010**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.TECH II SEM END EXAMINATIONS, JULY, 2015****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) List the important factors that influence the magnitude of factor of safety?
- b) Explain a technique to reduce stress concentration in machine components?
- c) Classify rivet heads according to Indian standards and specifications?
- d) State the major advantages of welded joints over riveted joints?
- e) What are the commonly used rivet materials?
- f) Differentiate between a thick cylinder and a thin cylinder?
- g) Identify the major applications of cotter joint?
- h) Compare torsional rigidity and lateral rigidity?
- i) Mention the function of a Coupling? Give any one practical applications.
- j) What is the functionality of a spring?

PART-B**Answer one question from each unit****[5X12=60M]****UNIT-I**

2. A machine component is subjected to a flexural stress with fluctuates between $+300 \text{ MN/m}^2$ and -150 MN/m^2 . Determine the value of minimum ultimate strength according to (i) modified Goodman relation (ii) Soderberg relation. **[12M]**

(OR)

3. a) Derive an expression for the impact stress induced due to falling load. **[4M]**
- b) An unknown weight falls through 10 mm on a collar rigidly attached to the lower end of a vertical bar of 3 m long and 600 mm^2 in section. If the maximum instantaneous extension is known to be 2 mm, what is the corresponding stress and the value of unknown weight? Take $E = 200 \text{ kN/mm}^2$. **[8M]**

UNIT-II

4. a) Discuss on the four types of failures of the riveted joints. **[3M]**
- b) A double riveted lap joint with zig-zag riveting is to be made for joining two plates 13 mm thick. The allowable stresses are 80 MPa in tension, 60 MPa in shear and 120 MPa in crushing. State how the joint will fail and find the efficiency of the joint. **[9M]**

CODE: 13ME2010

5. a) Sketch and discuss various types of welded joints used in pressure vessels. [4M]
b) A plate of 100 mm wide and 10 mm thickness is to be welded with another plate by means of transverse welds at the ends. If the plates are subjected to a load of 70 kN, find the size of the weld for static as well as fatigue loads. The permissible tensile stress should not exceed 70 MPa. [8M]

UNIT-III

6. A steam engine cylinder of 300 mm diameter is supplied with steam at 1.5 N/mm². The cylinder cover is fastened by means of 8 bolts of size M 20. The joint is made leak proof by means of suitable gaskets. Find the stress produced in the bolts. [12M]

(OR)

7. a) Show that in case of a thin cylindrical shell subjected to an internal fluid pressure, the tendency to burst lengthwise is twice as great as in the transverse section. [4M]
b) The internal diameter and thickness of a cast iron cylinder are given as 250 mm and thickness 75 mm respectively. Calculate the tangential and radial stresses at the inner and outer surfaces; if it is subjected to a pressure of 5 N/mm². [8M]

UNIT-IV

8. Design a sleeve and cotter joint to resist a tensile load of 60 kN. All parts of the joints are made of the same material with the following allowable stresses: $\sigma_t = 60$ MPa; $\sigma_c = 70$ MPa; and $\tau = 125$ MPa. [12M]

(OR)

9. A line shaft ABCD nine metres long, has four pulleys **A, B, C, D** at equal distance apart. Power of 45 kW is being supplied to the shaft through the pulley **C**, while the power is being taken off equally from the pulleys **A, B, D**. The shaft runs at 630 rpm. Calculate the most economical diameters for the various portions of the shaft so that the shear stress does not exceed 55 MPa. If the shear modulus is 85 GPa. [12M]

UNIT-V

10. Design a protective type of cast iron flange coupling for a steel shaft transmitting 15 kW at 900 r.p.m. from an electrical motor to a compressor. The service factor may be assumed as 1.35. The following permissible stresses may be used in the design: shear stress of the shaft, bolt and key material = 40 MPa; crushing stress for bolt and key = 80 MPa; shear stress for cast iron = 8 MPa. [12M]

(OR)

11. Design a helical spring for a spring loaded safety valve (Ramsbottom safety valve) for the following conditions: Diameter of the valve seat = 65 mm; operating pressure = 0.7 N/mm²; maximum pressure when the valve blows off freely = 0.7 N/mm²; maximum lift of the valve when the pressure rises from 0.7 to 0.75 N/mm² = 3.5 mm; maximum allowable stress = 550 MPa; modulus of rigidity = 84 kN/mm²; spring index = 6. Also with a neat sketch show the main dimensions of the free spring. [12M]

Code: 13EC2011**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.TECH II SEM END EXAMINATIONS, July 2015****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) What is Relaxation time?
 - b) Mention some of the applications of Ampere's law?
 - c) Write Maxwell's Two Equations for Electrostatic Fields?
 - d) What is Biotsavart's law?
 - e) Define Conduction Current Density?
 - f) Define Intrinsic impedance?
 - g) Define Losslessline?
 - h) Find reflection coefficient for matched transmission line?
 - i) Define transverse wave?
 - j) What is VSWR?

PART-B**Answer one question from each unit****[5 X 12=60M]****UNIT-I**

2. Derive Expression for electric potential due to finite line charge?

(OR)

3.
 - a) Explain the following terms
 - i. Capacitance
 - ii. Conduction current
 - iii. Poissions équation.
 - b) State and prove Gauss law?

UNIT-II

4.
 - a) What is Inconsistency associated with Ampere's Law? How is it over come
 - b) Obtain expression for equation of continuity
- (OR)**
5.
 - a) State and Explain Lorentz's force equation.
 - b) Define Magnetic Flux and Magnetic Flux density. Derive expression for H in case of infinite current carrying conductor.

Code: 13EC2011**UNIT-III**

6. a) State Faraday's law and derive expression for induced EMF?
b) Write Maxwell's equations for static and time varying fields..
(OR)
7. Derive the boundary conditions for the Tangential components of Electrostatic fields at the boundary between two perfect dielectrics.

UNIT-IV

8. Derive the relation $E/H = \eta$ for uniform plane wave
(OR)
9. Derive an expression for Brewster angle when a wave is parallelly polarized

UNIT-V

10. Derive input impedance at any point on the transmission line.
(OR)
11. a) Discuss applications of Smith chart.
b) Derive secondary constants for low loss transmission line

Code: 13CS2008**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.TECH II SEM END EXAMINATIONS, JULY, 2015****COMPUTER ORGANIZATION AND ARCHITECTURE
(Common to CSE & IT)****Time: 3 Hours****Max Marks: 70****PART-A****Answer all questions****[1 X 10 = 10M]**

1. a) Define register
b) Define CISC
c) What is instruction pipelining?
d) Define Computer Organization
e) What is Address Bus?
f) Application of Parallel Processing
g) What are Shift micro operations?
h) What is multiprocessor?
i) Differentiate RAM and ROM
j) What is Arbitration Logic?

PART-B**Answer one question from each unit****[5X12=60M]****UNIT-I**

2. a) Classify different types of computers and interconnection networks
b) Write about fixed point representation

(OR)

3. a) Convert the following decimal numbers to the bases indicated.
 - i. 7562 to octal
 - ii. 1938 to hexadecimal
 - iii. 175 to binary
b) Write about error correction and detection codes

UNIT-II

4. a) Give an example for three address instructions
b) Explain in detail about various addressing modes

(OR)

5. Write about Stack organization

UNIT-III

6. a) Explain Cache memory and multiprogramming
b) Analyze Memory Address Map.

(OR)

7. Write about
 - i) Magnetic disks
 - ii) Magnetic tape

UNIT- IV

8. a) Write about isolated versus memory – mapped I/O
b) Explain about I/O bus and Interface modules

(OR)

9. a) Explain about Hand Shaking protocol
b) Analysis Asynchronous Serial transfer

UNIT-V

10. Write about
 - i) Static interconnection networks
 - ii) Dynamic interconnection networks

(OR)

11. Explain the applications of parallel processing

1 of 1