AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. II Semester Regular & Supplementary Examinations, April-2019
HYDRAULICS AND HYDRAULIC MACHINERY
(Civil Engineering)

Time: 3 Hours   **Max M: 70**

Answer ONE Question from each Unit
All Questions Carry Equal M
All parts of the Question must be answered at one place

UNIT-I

1. a) List out the types of dimensional analysis.   7 M
   Enumerate about dimensional homogeneity. Consider the equation $V = \sqrt{2gH}$

   b) Find an expression for the drag force on smooth sphere of diameter D,   7 M
   moving with a uniform velocity V in a fluid of density ρ and dynamic viscosity μ.

(OR)

2. a) Explain about types of forces acting in moving fluid.   7 M
   b) The resistance force R of a supersonic plane during flight can be   7 M
   considered as dependent upon the length of the aircraft l, velocity V, air viscosity μ, air density ρ and bulk modulus of air K. Express the functional relationship between these variables and the resisting force.

UNIT-II

3. a) Find the velocity of flow and rate of flow of water through a   7 M
   rectangular channel of 6 m wide and 3 m deep, when it is running full. The channel is having bed slope as 1 in 2000. Take Chezy's constant C=55.

   b) Derive Chezy's formula   7 M

(OR)

4. a) Find the rate of flow of water through a V-shaped channel as shown in   7 M
   the figure. Take the value of C=55 and slope of the bed 1 in 2000.
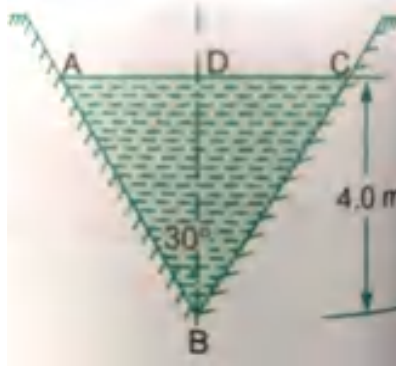
   b) A rectangular channel of width 4 m is having a bed slope of 1 in 1500.   7 M
   Find the maximum discharge through the channel. Take value of c = 50.

5. a) Derive the equation for impact of jet on vanes for a stationary vertical plate   7 M

    b) A jet of water of diameter 50 mm moving with a velocity of 40 m/sec, strikes a curved fixed symmetrical plate at the centre. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of 120^0 at the outlet of the curved plate.   7 M

(OR)

6. a) Find the force exerted by a jet on a stationary curved plate.   7 M

    b) A jet of water of diameter 50 mm strikes a fixed p late in such a way that the angle between the plate and the jet is 30^0. The force exerted in the direction of the jet is 1471.5 N. Determine the rate of flow of water.   7 M

UNIT-IV

7. a) Enumerate the constructional details of a pelton turbine.   7M

    b) A Pelton wheel is having a mean bucket diameter of 1 m and is running at 1000 r.p.m. The net head on the Pelton wheel is 700 m. If the side clearance angle is 15^0 and discharge through nozzle is 0.1 m^3/sec, find   7 M
        i. Power available at the nozzle and
        ii. Hydraulic efficiency of the turbine.

(OR)

8. a) Determine the power given by the jet of water to the runner of a Pelton wheel which is having tangential velocity as 20 m/s. The discharge through the jet is 0.03 m3/s and net head available is 50m. The side clearance angle is 15^0 and take C_v= 0.975.   7M

    b) Briefly enumerate about radial flow reaction turbine.   7 M

UNIT-V

9. a) Analyze the equations for various heads and efficiencies of a centrifugal pump.   7 M

    b) A centrifugal pump is to discharge 0.118 m3/s at a speed of 1450 r.p.m. against a head of 25 m The impeller diameter is 250 mm, its width at outlet is 50 mm and manometric efficiency is 75%. Determine the vane angle at the outlet periphery of the impeller.   7 M

(OR)

10. a) A centrifugal pump having outer diameter equal to two times the inner diameter and running at 1000 r.p.m. works against a total head of 40 m. The velocity of flow through the impeller is constant and equal to 2.5 m/s. The vanes are set back at an angle of 40^0 at outlet. If the outer diameter of the impeller is 500 mm and width at outlet is 50 mm, determine: 7 M
        i. Vane angle at inlet
        ii. Work done by the impeller on water per second

    b) Deduce the equation for minimum speed for starting a centrifugal pump.   7 M

AR16

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) Prove that $u = x^2 - y^2$ and $v = \dfrac{y}{x^2 + y^2}$ are harmonic functions of   6M
    f(x,y) but are not harmonic conjugates

    b) Prove that $\left(\dfrac{\partial^2}{\partial x^2} + \dfrac{\partial^2}{\partial y^2} \right) |Rf(z)|^2 = 2|f^1(z)|^2$ where f(z) is analytic   8M

(OR)

2. a) Show that the function $e^x(\cos y + i\sin y)$ is an analytic function   4M
    and find its derivative

    b) If $u - v = (x - y)(x^2 + 4xy + y^2)$ and $f(z) = u + iv$ is an analytic function   10M
    of $z = x + iy$, find f(z) in terms of z

UNIT-II

3. a) Evaluate $\int (z-a)^n dz$ where C is the circle with centre 'a' and   8M
    radius 'r'. Discuss the case when n = −1.

    b) Evaluate $\int_C \dfrac{e^{3iz}}{(z+\pi)^3} dz$ $where$ C is $|z - \pi| = 3.2$ 6M

(OR)

4. a) State and Prove Cauchy's Integral theorem   6M

    b) Evaluate the integral $\int_c \dfrac{4 - 3z}{z(z-1)(z-2)}$ $where$ C is the $circle$ $|z| = \dfrac{3}{2}$ using   8M
    Cauchy integral formula

UNIT-III

5. a) Find the Laurent series expansion for $\frac{z+1}{z-1}$, in the disc $|z| < 1$ and in the complementary set of disc $|z| > 1$ 7M

    b) Define the following terms with examples   7M
       i) Essential Singularity   ii) Isolated singularity
       iii) Pole of order m

(OR)

6. Find the Laurent series expansion for the following function in the given domain   14M

    a) $\dfrac{z^2 - 1}{(z+2)(z+3)}$ *for* $|z| > 3$

    b) $\dfrac{24}{z^2(z-1)(z+2)}$ *for* $0 < |z| < 1$

UNIT-IV

7. Using Residue theorem, evaluate   14M

$$f(z) = \frac{1}{2\pi i} \int_C \frac{e^{zt}}{z^2 (z^2 + 2z + 2)} \, dz \quad \text{where } C \text{ is the circle } |z| = 3$$

(OR)

8. Using complex variable techniques evaluate the real integral $\displaystyle\int_0^{2\pi} \frac{\sin^2 \theta}{5 - 4\cos\theta} d\theta$ 14M

UNIT-V

9. a) Show that $\Gamma(n)\Gamma(1-n) = \dfrac{\pi}{\sin n\pi} \quad (0 < n < 1)$ 6M

    b) Evaluate i) $\displaystyle\int_0^\infty \frac{x^a}{a^x} dx$ ii) $\displaystyle\int_0^1 x^{n-1} \cdot \left[\log_e \frac{1}{x}\right]^{m-1} dx$ 8M

(OR)

10. Prove that $\beta(m,n) = \dfrac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$ 14M

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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 crystallization of Metals with neat diagrams.   8M
   b) Explain electron cloud. What is the role of electron cloud in Metallic bond?   6M
   (OR)
2. a) What do you understand by metallic bonding? Why is it non-directional nature?   7M
   b) Covalent bonded solids are poor electrical conductors. Explain why?   7M

UNIT-II

3. a) What is an interstitial solid solution name the five elements which commonly form   8M
      interstitial solid solutions?
   b) Differentiate between Substitutional and Interstitial solid solutions.   6M
   (OR)
4. a) An alloy is more useful than a pure metal, discuss.   6M
   b) Explain the types of solid solutions with neat sketches?   8M

UNIT-III

5. a) Discuss various methods used for drawing phase diagrams   6M
   b) What is Isomorphous alloy system? Explain with suitable example.   8M
   (OR)
6 Draw a neat Iron-Iron carbide diagram and explain the three invariant reactions.   14M

UNIT-IV

7. a) Differentiate between white cast iron and malleable cast iron .   6M
   b) What type of stainless steel would you prefer for the following? Why?   8M
      i. Wrist watches   ii. Razor blades iii. Utensils iv. Welded structures.
   (OR)
8. a) State and describe various factors affecting the properties of cast Irons.   6M
   b) Classify the steels? Write the advantages of steels over cast irons?   8M

UNIT-V

9. a) Write short notes on   8M
         i.   Flame hardening ii. Induction hardening.
   b) Define powder metallurgy and explain stages in powder metallurgical   6M
      components preparation?
   (OR)
10. a) Explain: 8M
         i.   Annealing ii. Hardening
    b) Explain any two methods of production of metals powders with neat diagrams   6M

CODE: 16EC2012   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. II Semester Regular & Supplementary Examinations, April-2019
RANDOM VARIABLES AND STOCHASTIC PROCESSES
(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) State and prove total probability theorem   7M
   b) If A and B are two independent events then prove that $\overline{A}$ and $\overline{B}$, $\overline{A}$ 7M
      and B are also independent.

(OR)

2. a) A ship can successfully arrive at its destination if it engine and its   7M
      satellite navigation system do not fail en route. If the engine and
      satellite navigation system are known to fail independently with
      respective probabilities of 0.05 and 0.001, what is the probability of
      successful arrival.
   b) Suppose 5 men out of 100 and 25 women out of 10,000 are color blind.   7M
      A color blind person is chosen at random. What is the probability of
      the person being a male (assume that male and female to be in equal
      numbers)

UNIT-II

3. a) Define probability density function and write its properties   7M
   b) A student is known to arrive late for a class 40% of the time. If the   7M
      class meets five times each week, find the probability that (i) the
      student is late for at least three classes in a week (ii) the student will
      not be late at all during a given week

(OR)

4. a) For a Gaussian random variable X having $a_X = 3$ and $\sigma_X = 2$, compute   7M
      the probability of the event $\{|X| \leq 5.5\}$

   b) Determine the skew of exponentially density function   7M

$$f(x) = \begin{cases} \dfrac{1}{b} e^{-\frac{x-a}{b}}, & x > a \\ 0, & x < a \end{cases}$$

UNIT-III

5. a) Define joint density function and write its properties   7M
    b) Consider a random variable X having mean value 3 variance 2 and   7M
       another random variable Y having a relation with X has Y=-6X+22.
       Calculate the mean value of Y and correlation between X and Y.

(OR)

6. a) Is the function $F_{X,Y}(x, y) = \begin{cases} 0 & x < y \\ 1 & x \geq y \end{cases}$ a valid joint distribution function?   7M

       Justify your answer
    b) The joint probability density function of two random variables X,Y is   7M
       given by

       $f_{X,Y}(x, y) = \dfrac{1}{12}u(x)u(y)e^{-\left(\frac{x}{4}+\frac{y}{3}\right)}$. Show that X and Y are independent

UNIT-IV

7. a) Define autocorrelation function of a wide sense stationary random   7M
       process and write its properties
    b) Show that a random process is defined by $X(t) = A\sin(\omega_0 t + \theta)$ where A 7M
       and ω_0 are constants and θ is a uniformly distributed random variable
       on $(-\pi,\pi)$ is wide-sense stationary

(OR)

8. a) Explain cross correlation of two random processes.   7M
    b) If $X(t)$ is a stationary random process with mean $E[X(t)] = 3$ and auto   7M
       correction function $R_{XX}(\tau) = 9 + 2e^{-|\tau|}$, find (i) Mean value (ii) the

       variance of random variable $Y = \int_0^2 X(t)dt$

UNIT-V

9. a) Compute the auto correlation function of power spectrum   7M

       $S_{XX}(\omega) = \dfrac{8\omega^2 + 47}{\omega^4 + 13\omega^2 + 36}$
    b) Determine the average power of the random process   7M
       $X(t) = A_0 \cos(\omega_0 t + \theta)$ where A_0 and ω_0 are constants and θ is a uniformly

       distributed random variable on $\left(0, \dfrac{\pi}{2}\right)$

(OR)

10. a) Write the properties of cross power density spectrum   7M
    b) Derive the relation between power spectral density and auto   7M
       correlation function.

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CODE: 16CS2010   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular/Suppl. Examinations, April,2019
PRINCIPLES OF PROGRAMMING LANGUAGES
(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)	Compare declarative and imperative languages. What makes a language successful?	7 M
	b)	Discuss in detail about compilation and interpretation process?	7 M
		(OR)	
2.	a)	Compare BNF with EBNF with example?	7 M
	b)	Explain about Derivation and Parse trees with example?	7 M

UNIT-II

3.	a)	Define: Binding time, Language design time, Language implementation time, Program writing time, Compile time, Link time and Load time?	7 M
	b)	Explain about Static allocation and Stack-based allocation?	7 M
		(OR)	
4.		Explain about Attribute Grammar with evaluation of attributes?	14 M

UNIT-III

5.	a)	Explain the differences between Structured and Unstructured flow?	7 M
	b)	Discuss about Precedence and Associativity rules with example?	7M
		(OR)	
6.	a)	Discuss about the syntax and operations of Structures and Unions?	7 M
	b)	Define an array and write about syntax and operations of Arrays?	7 M

UNIT-IV

7.	a)	Explain the structure of multi catch-exception and write an example program in C++?	7 M
	b)	Discuss about Co-routines?	7 M
		(OR)	
8.		Explain in detail about parameter passing in detail with suitable examples?	14 M

UNIT-V

9.	a)	Write a C++ code for double linked list?	7 M
	b)	Explain about Overloaded Constructors with example?	7 M
		(OR)	
10.	a)	Explain about Data hiding process in Ada?	7 M
	b)	Discuss about Inner classes in Java?	7 M

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AR13

CODE: 13CE2007   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, April-2019

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 dimensional homogeneity.
   b) Force exerted by the jet in the direction of jet, while jet strikes the stationary curved plate at the centre.
   c) What are the conditions for most economical rectangular section?
   d) What is Reynold's number?
   e) Define critical depth for open channel flows.
   f) Classification of flows in channel.
   g) Define degree of reaction.
   h) Define unit discharge of the turbine.
   i) Define cavitation.
   j) What is the need of model testing in centrifugal pump?

PART-B

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

UNIT-I

2. a) Explain Buckingham π –method with suitable example.   [6]
   b) In flow over a smooth flat plate, the wall shear τ_w in the boundary layer depends on the free stream velocity, density and viscosity of the fluid and the distance from the leading edge. Determine the dimensionless parameters to express the relation between the variables.   [6]

(OR)

3. a) Explain the principle of dimensional homogeneity   [6]
   b) A spherical ball of diameter D and weight w is balanced at the tip of a jet of diameter d at a height h. The velocity of the jet is u. If the other parameters are the liquid density and viscosity, find the π terms that can be used to characterize the phenomenon.   [6]

UNIT-II

4. a) What is meant by an economical section of a channel?   [4]
   b) A trapezoidal channel has side slopes of 3 horizontal to 4 vertical and slope of its bed is 1 in 2000. Determine the optimum dimensions of the channel, if it is to carry water at 0.5 m^3/s. Take Chezy's constant as 80.   [8]

(OR)

5. a) What is the relation between Manning's constant and Chezy's constant.   [4]
   b) Find the diameter of a circular sewer pipe which is laid at a slope of 1 in 8000 and carries a discharge of 800 litres/s when flowing half full. Take the value of Manning's N = 0.020.   [8]

6. a) Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet. [4]

    b) A jet of water of diameter 50 mm strikes a fixed plate in such a way that the angle between the plate and the jet is 30^0. The force exerted in the direction of the jet is 1471.5 N. Determine the rate of flow of water. [8]

(OR)

7. a) Show that the angle of swing of a vertical hinged plate is given by $\sin\theta = \dfrac{\rho a V^2}{W}$, where V = velocity of the jet striking the plate, a = Area of the jet, and W = Weight of the plate. [4]

    b) A jet of water of diameter 50 mm, having a velocity of 20 m/s strikes a curved vane which is moving with a velocity of 10 m/s in the direction of the jet. The jet leaves the vane at an angle of 60^0 to the direction of motion of vane at outlet. Determine [8]
    i. the force exerted by the jet on the vane in the direction of motion,
    ii. work done per second by the jet.

UNIT-IV

8. a) What is a draft-tube? Why is it used in a reaction turbine? Describe with sketch two different types of draft-tubes. [6]

    b) Enumerate the constructional details of a pelton turbine. [6]

(OR)

9. a) What is the basis of selection of a turbine at a particular place? [4]

    b) A reaction turbine works at 500 RPM under a head of 100 m. The diameter of turbine at inlet is 100 cm and flow area is 0.35 m^2. The angles made by absolute and relative velocities at inlet are 15^0 and 60^0 respectively with the tangential velocity. Determine [8]
    i. The volume flow rate   ii. The power developed.
    iii. Efficiency. Assume whirl at outlet to be zero.

UNIT-V

10. a) What do you understand by characteristic curve of a pump? What is the significance of the characteristic curves? [6]

    b) The diameter of an impeller of a centrifugal pump at inlet and outlet are 20 cm and 40 cm respectively. Determine the minimum speed for starting the pump if it works against a head of 25 m. [6]

(OR)

11. a) Define cavitation. What are the effects of cavitation? Give the necessary precautions against cavitation. [4]

    b) A centrifugal pump is running at 1000 rpm. The outlet vane angle of the impeller is 30^0 and velocity of the flow is 3 m/s. The pump is working against a total head of 30 m and the discharge through the pump is 0.3 m^3/s. If the manometric efficiency of the pump is 75 %, determine [8]
    i. the diameter of the impeller, and
    ii. the width of the impeller at outlet.

Code: 13ME2009   SET I

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT,TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, April-2019

KINEMATICS OF MACHINERY
(Mechanical Engineering)

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

PART –A

ANSWER ALL QUESTIONS

1.   10M
   a. Define Kinematic pair
   b. Differentiate between Mechanism and machine
   c. What is the application of Pantograph
   d. Define velocity Ratio
   e. What is a configuration diagram
   f. What is the tangential acceleration component
   g. What is a displacement diagram
   h. List any two types of followers
   i. Define Law of gearing
   j. What is a reverted Gear train?

PART –B

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

UNIT I
2. How are the kinematic pairs classified? Explain with examples.   12M
                                    OR
3. Enumerate the inversions of a double slider crank chain, give examples.   12M

UNIT II
4. Sketch a Paucellier mechanism. Show that it can be used to trace a straight line.
                                                                                     12M
                                    OR
5. Derive an expression for the ratio of angular velocities of the shafts of a Hook's joint.
                                                                                     12M

UNIT III

6. What is the Coriolis acceleration component? In which cases does it occur? How is it determined?   12M

OR

7. In a four- link mechanism, the crank AB rotates at 36 rad/s. The lengths of the links are AB=200mm, BC=400mm, CD= 450mm and AD=600mm. AD is the fixed link. At the instant when AB is at right angles to AD determine the velocity of (i) the midpoint of link BC (ii) Angular velocity of link CD .   12M

UNIT IV

8. Deduce expressions for the velocity and acceleration of the follower when it moves with simple harmonic motion.   12M

OR

9. A cam with 50 mm as minimum diameter is rotating clock-wise at a uniform speed of 1000 rpm and has to give the following motion to a knife edge follower.

   a) Follower to complete outward stroke of 25mm during 120^0 of cam rotation with simple harmonic motion.
   b) Follower to dwell for 30^0 of cam rotation
   c) Follower to return to its initial position during 90^0 of cam rotation with simple harmonic motion
   d) Follower to dwell for the remaining 120^0 of cam rotation.

   Draw the cam profile if its axis of the follower passes through the axis of the cam. Determine the maximum velocity of the follower during the outstroke.   12M

UNIT V

10. Two gear wheels mesh externally and are to give a velocity ratio 3:1. The teeth are involute form. Module= 6mm, addendum= one module, Pressure angle: 20°. The pinion rotates at 100 rpm.   Find: a) Number of teeth on pinion to avoid interference on it and the corresponding no. of teeth on the wheel. b) The length of path and arc of contact. c) The no. of pairs of teeth in contact. d) The velocity of sliding at engagement, disengagement and pitch point.   12M

OR

11. An epicyclic gear train consists of sun wheel S, a stationary internal gear E and 3 identical planet wheels P carried on a star – shaped planet carrier C. The sizes of different toothed wheels are such that the planet C rotates at 1/5 of the speed of the sun wheel S. The minimum number of teeth on any wheel is 16. The driving torque on the sun wheel is 100 Nm. Determine a) Number of teeth on different wheels of the train b) Torque necessary to keep the internal gear stationary
12M.

AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, April-2019
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) Define closed loop system?
    b) Why negative feedback is invariably preferred in a closed loop system?
    c) Define transfer function?
    d) What is block diagram? What are the basic components of block diagram?
    e) Write the differential equation governing the ac servomotor.
    f) Define peak overshoot?
    g) What is the effect of PD controller on the system performance?
    h) Define corner frequency?
    i) What is routh stability criterion?
    j) When lag-lead compensation is employed?
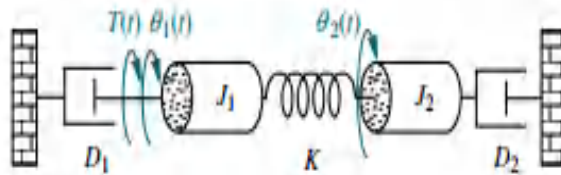
PART-B

Answer one question from each unit   [5x12=60M]
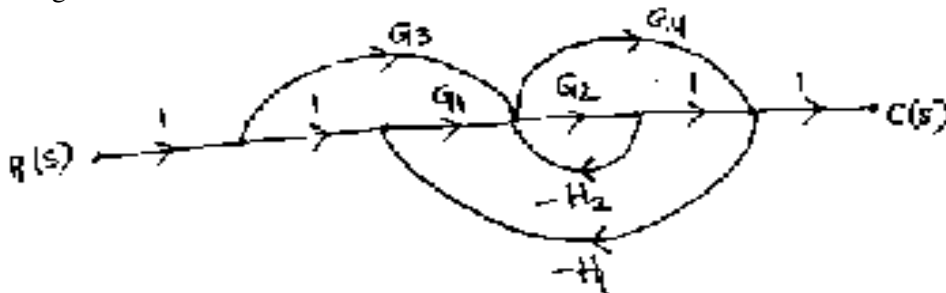
UNIT-I

2. a) Write torque balance equation for each mechanical rotational system elements?   6M
    b) Consider the mechanical rotational system shown in figure given below, Draw   6M
        torque – current analogous circuit.

(OR)

3. a) What are basic rules for block reduction technique   6M
    b) Find the overall transfer function of the system whose signal flow graph is shown
        in figure.

UNIT-II

4.   What is A.C. servomotor? Derive the transfer function of A.C. servomotor?   12M

(OR)

5. a)   The open loop transfer function of an unity feedback control system is given by   6M

$$G(s) = \frac{100}{s(s+2)(s+5)}$$

For unit step input , find the time response of the closed loop system and determine % overshoot and rise time.

   b)   A unity feedback system has   6M

$$G(s) = \frac{1}{s(1+s)}$$

The input to the system is described by $r(t) = 4 + 6t + 2t^3$.Find the generalised error coefficients and steady state error.

UNIT-III

6. a)   Construct Routh array and determine the stability of the system whose characteristic equation is $s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16 = 0$. Also determine the number of roots lying on right half of s plane ,left half of s plane and on imaginary axis.   6M

   b)   A feedback system has open loop transfer function of   6M

G(S)=K/{S(S^2+5S+9)}

Determine the value of K for marginally stabile system.

(OR)

7.   The open loop transfer function of a unity feedback system is given by,   12M

G(S)=K/{S(S+1)(S+3)}. Sketch the root locus of the system.

UNIT-IV

8.   Sketch bode plot for the following transfer function and determine the gain margin and phase margin. G(S)=10/{S(0.5S+1)(0.1S+1)}   12M

(OR)

9.   The open loop transfer function of a system is given by   12M

$$G(s) = \frac{K}{s(s^2 + s + 4)}$$

Using polar plot determine the value of K, so that phase margin is 50^0. What is the corresponding value of gain margin?

UNIT-V

10. a)   What is lag – lead compensator? Give an example.   6M

    b)   Write the transfer function of lead compensator and draw its pole zero plot   6M

(OR)

11.   Obtain two differential state representation for the system with transfer   12M

function $\frac{Y(s)}{U(s)} = \frac{1}{s^3 + 4s^2 + 12s + 4}$

AR13

CODE: 13CS2010   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, April-2019

PRINCIPLES OF PROGRAMMING LANGUAGES
(Common to CSE & IT)

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

PART-A

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

1.
  a) What is a pure interpreter?
  b) What is the role of symbol table?
  c) Which macro is used in C to define symbolic constants?
  d) What is the scope and life time of an instance variable in JAVA?
  e) Define shortcut evaluation.
  f) What is the difference between recursion and iteration?
  g) What are the merits of sub range types?
  h) What is dangling pointer?
  i) What is type inferencing used in ML?
  j) Write few points about LISP interpreter

PART-B

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

UNIT-I

2. a) What is the difference between a sentence and a sentential form in a CFG?   4M
   b) Explain with an example how the weakest precondition for a logical pretest loop is derived   8M

(OR)

3. a) Discuss about Context-free grammar and regular expression? Give the parse tree of a following statement: A = (B+C) * (D / E)   8M
   b) Define CFG? What does it mean for CFG to be ambiguous?   4M

UNIT-II

4. a) What is an attribute grammar? Explain the process of decoration of a syntax tree with example   10M
   b) What is late binding   2M

(OR)

5. a) Explain briefly about scope rules.   6M
   b) Explain about macro expansion and conditional compilation in C   6M

UNIT-III

6. a) Explain in detail various design issues of character string types and enumeration types   6M
   b) Tail recursion elimination   6M

(OR)

7. a) Explain in detail multiple selection constructs   8M
   b) What is slicing in arrays? Explain briefly.   4M

AR13

UNIT-IV

8.   Explain the following terms :   12M
            i).Message passing
            ii) Concurrency and synchronization mechanism.
            iii).Monitors

(OR)

9.   Discuss how producer-consumer problem and Dining philosophers problem are   12M
        solved using concurrency in ADA

UNIT-V

10. a) Write a prolog description of your family tree (based only on facts),going back to   8M
        your grand parents and including all descendants. Be sure to include all
        relationships
    b) With respect to the object oriented programming, briefly explain virtual functions   4M

(OR)

11. a) Explain dynamic method binding using virtual functions with example.   8M
    b) Discuss about basic elements of prolog   4M