AR16

CODE: 16CE2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

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) Write the dimensions of the following quantities **6M**
Dynamic viscosity, stress, angular velocity, power, Torque, force

b) The resistance force F of a ship is a function of its length L, velocity V, acceleration due to gravity g and fluid properties like density ρ and viscosity μ. Write the relationship in a dimensionless form. **8M**

(OR)

2. a) Show by method of dimensional analysis the resisting force 'R' of a supersonic plane during flight which depends on length of air craft L, Velocity V, air viscosity μ, air density ρ, and bulk density K, can be expressed as R = $\rho L^2 V^2 \phi\left[\left(\frac{\mu}{LV\rho}\right),\left(\frac{K}{\rho V^2}\right)\right]$ **8M**

b) Describe the Buckingham's method of dimensional analysis. **6M**

UNIT-II

3. a) Derive the relation between the alternate depths and critical depth in a rectangular channel. **6M**

b) Explain classification of channel bottom slopes for GVF in open channels. **8M**

(OR)

4. a) For critical flow in rectangular channel, show that specific energy $E = \frac{3}{2}Y_c$ **6M**

b) A sluice gate discharges water into a horizontal rectangular channel with a velocity of 6m/s and depth of flow is 0.4m. The width of the channel is 8m. Find height of the jump and energy loss per kg of water. **8M**

UNIT-III

5. a) Derive an expression for force exerted by a jet on a flat vertical plate moving in the direction of jet. Also find an expression for work done per second by the jet. **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) Show that the efficiency of a free jet striking normally as series of flat plates mounted on the periphery of a wheel never exceeds 50%. **6M**

b) A jet of water having a velocity of 45m/s impinges without shock a series of vanes moving at 15 m/s, the direction of motion of vanes being inclined at 20^0 to that of the jet. The relative velocity at outlet is 0.9 of that at inlet, and the absolute velocity of the water at exit is to be normal to motion of vanes. Find (i) vane angles at entrance and exit (ii) work done on vanes per unit weight of water supplied by the jet **8M**

UNIT-IV

7. a) Explain the terms specific speed, unit speed, unit power and unit discharge as applied to hydraulic turbines. **6M**

b) Design a pelton wheel for a head of 80 m and speed 300 r.p.m. The wheel develops 103 kW shaft Power. Take C_v= 0.98, speed ratio = 0.45 and overall efficiency is 80%. **8M**

(OR)

8. a) Explain working of a Francis turbine with a neat sketch. **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) What are the different efficiencies of a 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) Draw and explain main and operating characteristic curves of a 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: 16BS2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

COMPLEX VARIABLES AND SPECIAL FUNCTIONS

(Electrical and 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) Verify that $u = 3xy^2 - x^3$ is harmonic in C. **7**

   b) Find 'a ' and 'b ' if $f(z) = \left(x^2 - 2xy + ay^2\right) + i\left(bx^2 - 2xy - y^2\right)$ is analytic. **7**

(OR)

2. Using Milne - Thompson method, find the analytic function whose imaginary part is $v = x^2 - y^2 + \frac{x}{x^2 + y^2}$. **14**

UNIT-II

3. Evaluate $\int_{z=0}^{2+i} z^2 dz$ along the real axis to 2 and then vertically to $2+i$ **14**

(OR)

4. Evaluate using Cauchy Integral Formula $\int_C \frac{e^{2z}}{(z-1)(z-2)} dz$ where $C : |z| = 3$ **14**

UNIT-III

5. Find the Laurent expansion of $f(z) = \frac{1}{z^2 - 4z + 3}$ for $1 < |z| < 3$ **14**

(OR)

6. Find the Laurent series of the function $f(z) = \frac{z}{(z+1)(z+2)}$ about $z = -2$ **14**

UNIT-IV

7. Evaluate $\int_0^{\infty} \frac{dx}{x^4 + a^4}$ **14**

(OR)

8. Show by the method of residues $\int_0^{\pi} \frac{d\theta}{a + b\cos\theta} = \frac{\pi}{\sqrt{a^2 - b^2}}$ **14**

UNIT-V

9. Derive the relation between beta and gamma function. i.e. $\beta(m,n) = \frac{\gamma(m)\gamma(n)}{\gamma(m+n)}$ where m>0, n>0 **14**

(OR)

10. Evaluate $\int_0^{\infty} \frac{x}{1+x^6} dx$ using $\beta - \gamma$ functions **14**

AR16

CODE: 16ME2012 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ENGINEERING METALLURGY

(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)	Bring out the differences between Crystal, dendrite, grain and grain boundary.	**7 M**
	b)	Differentiate between amorphous solids and crystalline solids.	**7 M**
		(OR)	
2.	a)	Summarize the classes of solids based on bonding.	**14M**

UNIT-II

3.	a)	How is the solid solution different from intermetallic compounds? Describe.	**10M**
	b)	Why are alloys produced? Explain why alloys find more applications than pure metals.	**4 M**
		(OR)	
4.	a)	Write about intermediate alloy phases. Give any two examples each.	**7 M**
	b)	What is Gibb's phase rule? Apply Gibb's phase rule for eutectic alloy.	**7 M**

UNIT-III

5.	a)	List and explain three reactions present in the Fe-Fe_3C equilibrium diagram.	**7 M**
	b)	Explain the cooling curve of 4.3% Carbon in Fe-Fe_3C system.	**7 M**
		(OR)	
6.	a)	Discuss any two methods used for construction of phase diagrams. Give the advantages and limitations of each method.	**14 M**

UNIT-IV

7.	a)	Give at least four advantages of maraging steel as compared to regular stainless steel.	**4 M**
	b)	Explain the following structural phases with their mechanical properties. (a)Ferrite b) Cementite c) Austenite d) Pearlite.	**10 M**
		(OR)	
8.	a)	Give manufacturing method, properties, microstructure, and applications of White cast iron.	**10 M**
	b)	Which stainless steel is best suited for surgical instruments? Explain.	**4 M**

UNIT-V

9.		Write a short note on: (i) Annealing (ii) Hardening iii) Normalizing and iv) Tempering.	**14 M**
		(OR)	
10.	a)	Distinguish between flame hardening and induction hardening.	**7 M**
	b)	write short note on the following: i)Atomization ii) Milling iii) Electrolysis	**7 M**

AR16

CODE: 16EC2012 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-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) Explain Discrete and Continuous sample Spaces with examples 6M
   b) In the experiment of throwing two fair dice, let A be the event that the first die is odd, B be the event that the second die is odd, and C be the event that the sum is odd. Show that events A, B, and C are pair wise independent, but A, B, and C are not independent 8M

(OR)

2. a) The probabilities of three students to solve a problem in Mathematics are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{4}$ respectively, find the probability that the problem to be solved 7M
   b) If A_1, A_2, B_1, B_2 are four events of a sample space such that $P(B_1) = 0.6,\ P(B_2) = 0.4,\ P(A_1 / B_1) = 0.95,\ P(A_2 / B_1) = 0.05, P(A_1 / B_2) = 0.05$ and $P(A_2 / B_2) = 0.95$, find (i) $P(A_1)$ (ii) $P(A_2)$ 7M

UNIT-II

3. a) Define distribution function and write its properties 7M
   b) Define Gaussian density function and distribution function in detail. 7M

(OR)

4. a) Determine the probability of $\{|X| \le 11.2\}$ in a Gaussian random variable X having the mean $a_X = 10$ and variance $\sigma_X{}^2 = 4$ 7M
   b) Define exponential density function and determine its characteristic function 7M

UNIT-III

5. a) Define joint distribution function and write its properties 7M
   b) The joint density function of X and Y is $f_X(x, y) = \begin{cases} (x^2 + y^2)/8\pi \text{ for } x^2 + y^2 < b \\ 0 \text{ elsewhere} \end{cases}$ find b 7M

(OR)

6. a) The joint probability density function of two random variables X, Y is given by $f_{X,Y}(x, y) = \begin{cases} \frac{xy}{4}, & 0 \le x \le 2,\ 0 \le y \le 2 \\ 0 & \text{otherwise} \end{cases}$ find (i) joint probability distribution function $F_{X,Y}(x, y)$ (ii) the probability $P(0 \le X \le 1, 0 \le X \le 1)$ 7M
   b) If X a random variable with mean $E(X) = 3$, variance $\sigma_X{}^2 = 2$ and $Y = -6X + 22$, determine the second order moment of X and Y 7M

UNIT-IV

7. a) Define random process and classify the random processes 7M

b) Given the autocorrelation function, for a stationary ergodic process with no periodic components, is $R_{XX}(\tau) = \frac{26 + 25\tau^2}{1 + \tau^2}$. Determine the mean and variance of the process $X(t)$ 7M

(OR)

8. a) A random process is defined by $Y(t) = X(t)\cos(\omega_0 t + \theta)$ where $X(t)$ is wide sense stationary random process that amplitude-modulates a carrier of constant angular frequency ω_0 with a random phase θ independent of $X(t)$ and uniformly distributed on $(-\pi, \pi)$. Show that $Y(t)$ is wide-sense stationary 7M

b) Define cross correlation function of two jointly wide sense stationary random processes and write its properties 7M

UNIT-V

9. a) Explain Power Density Spectrum 7M

b) Determine the power spectrum of a random process $X(t)$, whose auto correlation function given by $R_{XX}(\tau) = \frac{A^2}{2}\cos(\omega_0 \tau)$, where A and ω_0 are constants 7M

(OR)

10. a) Derive the relationship between Power spectrum and Auto correlation 7M

b) A random process has the power density spectrum $S_{XX}(\omega) = \frac{6\omega^2}{\left(1 + \omega^2\right)^3}$. Determine the average power in the process 7M

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AR16

CODE: 16CS2010 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-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)	Determine the tokens present in addition of two numbers program in C.	7M
	b)	Explain context free grammar with an example.	7M
		(OR)	
2.	a)	Justify the need for studying programming languages.	7M
	b)	Differentiate between compilation and interpretation.	7M

UNIT-II

3.	a)	Determine the different times at which binding takes place.	7M
	b)	Differentiate between Overloading and coercion.	7M
		(OR)	
4.	a)	Explain the role of semantic analyzer.	7M
	b)	Differentiate between static and dynamic scoping.	7M

UNIT-III

5.	a)	Illustrate how short-circuit evaluation reduces the time for evaluating expressions.	7M
	b)	Write short notes on Enumeration types.	7M
		(OR)	
6.	a)	Explain logically controlled loops.	7M
	b)	Explain tail recursion with suitable example.	7M

UNIT-IV

7.	a)	Differentiate between call by value and call by reference.	7M
	b)	Illustrate how exceptions are handled in Java.	7M
		(OR)	
8.	a)	Explain propagation of exceptions with suitable examples.	7M
	b)	Illustrate in-line expansion of subroutines.	7M

UNIT-V

9.	a)	Differentiate between overloading and overriding.	7M
	b)	Illustrate different types of inheritance.	7M
		(OR)	
10.	a)	Explain how a class can be nested in another class in Java.	7M
	b)	Explain dynamic method binding with example.	7M

AR13

CODE: 13CE2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-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) Write short notes on Rayleigh's method used in dimensional analysis.
   b) Describe the classification of channel bottom slopes.
   c) Explain the specific energy.
   d) What is a critical slope?
   e) What are the characteristic curves of pelton turbine?
   f) What is the difference between Propeller turbine and Kaplan turbine?
   g) What is the difference between tangential and radial flows?
   h) What are the effects of cavitation?
   i) Define specific speed of a centrifugal pump.
   j) Define static and manometric head of a centrifugal pump.

PART-B

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

UNIT-I

2. a) Explain (i) Dimensionally homogenous equation.
   (ii) Repeating variables
   (iii) Superfluous and omitted variables.
   b) The resistance R experienced by a partially submerged body depends upon the velocity 'V', length 'L', viscosity 'μ', density 'ρ' and acceleration due to gravity 'g'. Obtain a dimensionless expression for R.

(OR)

3. a) State the Buckingham π-theorem. Explain the criteria to select the repeating variables.
   b) Derive equation for specific speed for a turbine, using variables P=power, N=speed, H=head, D=diameter, r=density of fluid, g=gravity.

UNIT-II

4. a) Derive the condition for depth of flow of a most economical circular channel section subject to the condition for maximum velocity.
   b) A hydraulic jump occurs in a 0.45 m wide rectangular channel at the point where depth of flow is 0.16 m and Froude number is 2.5. Calculate the sequent depths, loss of head and energy dissipated.

(OR)

5. a) Define GVF? Derive the dynamic equation for GVF by stating the assumptions clearly?
   b) A power canal of trapezoidal section has to be excavated through hard clay at the least cost. Determine the most economical dimensions of the channel given, discharge equal to 14 m^3/s bed slope1: 2500 and Manning's constant N= 0.020.

UNIT-III

6. a) A jet has a direct impact on a series of flat vanes mounted over the periphery of a large wheel. Determine the force of impact, the work done and the efficiency.
   b) A jet of water having a velocity of 45 m/s impinges on a series of vanes moving with a velocity of 30 m/s. The jet makes an angle of 30^0 to the direction of motion of vanes when entering and leaves at an angle of 120^0. Draw the triangles of velocities at inlet and outlet and find: (i) The angles of vanes tips so that water enters and leaves without shock. (ii) The work done per unit weight of water entering the vanes and (iii) The efficiency.

(OR)

7. a) Derive the expression for the work done by a jet of water acting on a series of vanes. Also prove in this case efficiency is maximum, when velocity of vane is equal to half of the velocity of jet.
   b) A jet of water 75 mm diameter strikes a curved plate at its center with a velocity of 20 m/sec. The curved plate is moving with a velocity of 8 m/sec in the direction of the jet, the jet is deflected through an angle of 165^0. Assuming the plate to be smooth, find (i) Force exerted on the plate in the direction of jet, (ii) Power of the jet and (iii) Efficiency of the jet.

UNIT-IV

8. a) Define the term "Governing of a turbine". Describe with a neat sketch the governing mechanism of impulse turbines.
   b) A Pelton wheel has to be designed for the following data: Power to be developed = 6000 kW. Net head available = 300 m; Speed = 550 rpm; Ratio of jet diameter to wheel diameter = 1/10; and overall efficiency = 85%. Find the number of jets, number of buckets, bucket dimensions, diameter of the jet, diameter of the wheel and the quantity of water required.

(OR)

9. a) How will you classify turbines?
   b) A reaction turbine works at 450 rpm under a head of 120 m. Its diameter at inlet is 120 cm and the flow area is 0.4 m^2. The angles made by absolute and relative velocities at inlet are 20^0 and 60^0 respectively with the tangential velocity. Determine: (i) The volume flow rate, (ii) The power developed, and (iii) Hydraulic efficiency.

UNIT-V

10. a) Define a centrifugal pump. Give the classification of centrifugal pumps.
    b) Layout the typical hydro power installation.

(OR)

11. a) Explain (i) NPSH (ii) Cavitation and (iii) Losses in pumps.
    b) A three stage centrifugal pump has impellers 40 cm in diameter and 2 cm wide at outlet. The vanes curved back at the outlet at 45^0 and reduce the circumferential area by 10%. The manometric efficiency is 90% and overall efficiency is 80%. Determine the head generated by the pump, when running at 1000 rpm, delivering 50 lps. What should be the power developed.

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AR13

CODE: 13ME2009 **SET-2**

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

KINEMATICS OF MACHINERY
(Mechanical Engineering)

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

PART-A

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

1. a) What is the Classification of a link.
   b) Differentiate Lower and higher pairs
   c) Sketch a pantograph
   d) What is the Velocity ratio of steering mechanism?
   e) Discuss Coriolis acceleration
   f) What is Instantaneous center
   g) What are the Types of cams
   h) Sketch the Roller follower
   i) Describe Higher pairs
   j) What do you mean by undercutting of gears?

PART-B

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

UNIT-I

2. a) State the difference between the closed and unclosed pairs giving examples in each case.
   b) Enumerate the inversions of a double slider-crank chain. Give examples.

(OR)

3. a) What is a Kinematic chain? What is the relation between the number of links and number of pairs in a kinematic chain?
   b) The length of the fixed link of a crank and slotted lever mechanism is 300 mm and that of the crank 110 mm. Determine,
   i. the inclination of the slotted lever with the vertical in the extreme position.
   ii. the ratio of the time of cutting stroke to the time of return stroke and
   iii. the length of the stroke, if the length of the slotted lever is 500 mm and the line of stroke passes through the extreme positions of the free end of the lever.

UNIT-II

4. a) Classify the straight line motion mechanisms with examples.
   b) Show that the pantograph can produce paths exactly similar to the ones traced out by a point on a link on an enlarged or a reduced scale.

(OR)

5. a) Derive the fundamental equation for correct steering.
   b) What are the relative merits and demerits of the Ackermann type of steering gear over that of Davis type?

UNIT-III

6. a) Explain the procedure to determine the velocity and acceleration of a slider crank mechanism by Klein's construction.
   b) In a for bar chain ABCD, AD is the fixed link 12 cm long, crank AB is 3 cm long and rotates uniformly at 100 rpm clockwise while the link CD is 6 cm long and oscillates about D. Link BC is equal to length AD. Find the angular velocity of link DC when angle BAD is 60^0.

(OR)

7. In a mechanism as shown in Figure 7, the link AB rotates with a uniform angular velocity of 30 rad/S. The lengths of various links are; AB = 100mm; BC = 300 mm; BD = 150 mm; DE = 250 mm; EF = 200 mm; DG=165 mm.Determine the velocity and acceleration of G for the given configuration.

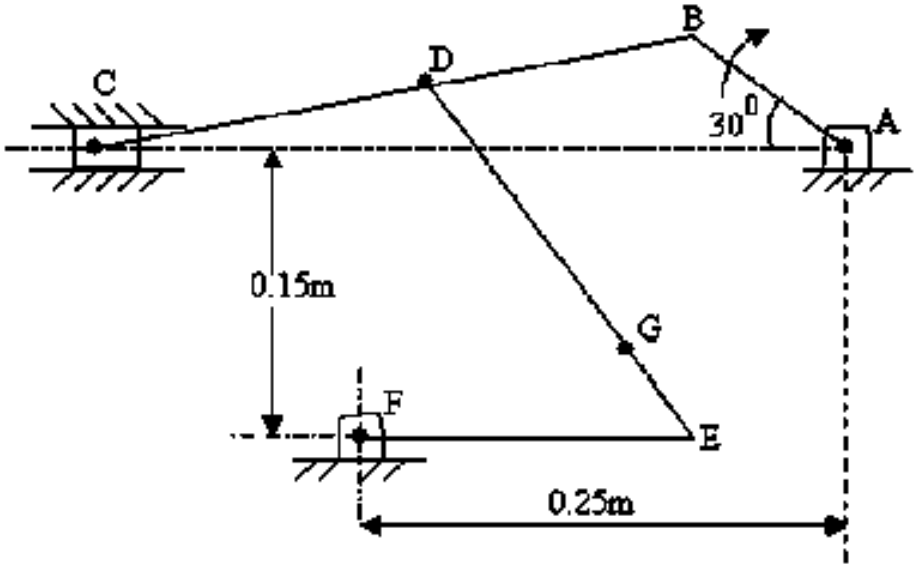

Figure-7

UNIT-IV

8. a) Write short notes on the following pertaining to cams
i. Base circle ii. Dwell. iii. Prime circle.

b) Explain the construction of cam profile for constant velocity motion to the knife edge follower of the cam.

(OR)

9. a) Derive an expression for displacement, velocity and acceleration of a tangent cam with roller follower. When roller is in contact with flank.

b) With the help of neat sketches explain the types of cams and followers.

UNIT-V

10. a) Derive the formula for the length of the path of contact for two meshing spur gear having involute profile.

b) An epicyclic gear train, as shown in Figure 10 consists of two sunwheels A and D with 28 and 24 teeth respectively, engaged with a compound planet wheels B and C with 22 and 26 teeth. The sunwheel D is keyed to the driven shaft and the sun wheel A is a fixed wheel co-axial with the dirven shaft The planet wheels are carried on an arm E from the driving shaft which is co-axial with the driven shaft.Find the velocity ratio of gear train. If 0.75 kW is transmitted and input speed being 100 r.pm. determine the torque required to hold the sunwheel A.

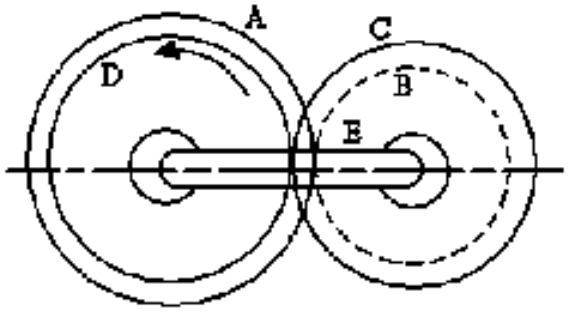

Figure-10

(OR)

11. a) Explain reverted gear train with the help of a sketch.

b) State and explain law of gearing?

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AR13

CODE: 13EE2013 **SET-1**

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

LINEAR CONTROL SYSTEMS
(Electronics and Communication Engineering)

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

PART-A

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

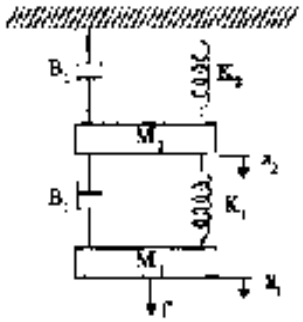
1. a) What is control system?
   b) Write Mason's gain formula
   c) Define linear system?
   d) What is servo mechanism?
   e) Compare D.C. and A.C. servo motors
   f) Name the test signals used in control system?
   g) List the time domain specifications?
   h) What is phase and gain margin ?
   i) What are the necessary condition for stability
   j) Define state transition matrix

PART-B

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

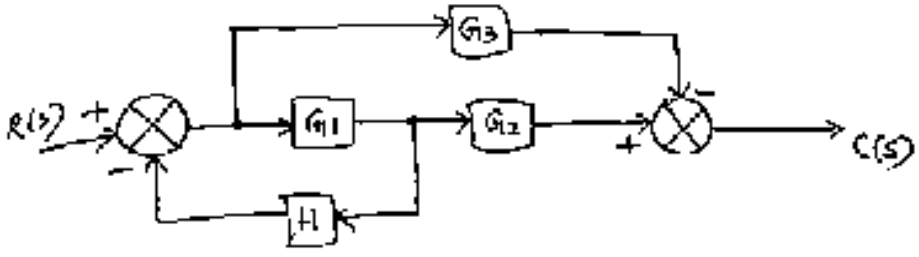
UNIT-I

2. a) Distinguish between open loop and closed loop system 6M
   b) Write the differential equations governing the mechanical system given below 6M



(OR)

3. Convert the block diagram shown in figure to signal flow graph and find the transfer function of the system 12M



UNIT-II

4. Derive the transfer function and develop the block diagram of armature controlled D.C. servo motor 12M

(OR)

5. a) Consider the unity feedback closed loop system where the forward transfer function is $G(s) = \frac{25}{s(s+5)}$. obtain the rise time, peak time, Maximum peak overshoot and the settling time when the system is subjected to a unit step input. 6M

   b) For a system whose 6M

$$G(s) = \frac{10}{s(s+1)(s+2)}$$

Find the steady state error when it is subjected to the input $r(t)= 1+2t +1.5t^2$.

UNIT-III

6. a) Using Routh criterion , determine the stability of the system represented by the characteristic equation $s^4 +8s^3 +18s^2 +16s+5 .= 0$ 6M

   b) The open loop transfer function of a unity feedback system is given by, 6M

$$G(s) = \frac{K(s+1)}{s^3+as^2+2s+1}$$

Determine the value of K and a, so that the system oscillates at a frequency of 2 rad/sec

(OR)

7. Sketch the root locus of the system whose open loop transfer function is, 12M

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

Find the value of K, so that the damping ratio of the closed loop system is 0.5.

UNIT-IV

8. Sketch the bode plot for the following transfer function and determine phase margin and gain margin. 12M

$$G(s) = \frac{75(1+0.2s)}{s(s^2+16s+100)}$$

(OR)

9. Consider a unity feedback system having an open loop transfer function , 12M

$$G(s) = \frac{K}{s(1+0.5s)(1+4s)}$$

Sketch the polar plot and find out gain margin and phase margin for k=100..

UNIT-V

10. a) What are the characteristics of lag – lead compensation? When lag - lead compensation is employed? 6M

    b) Draw the bode plot of lag –lead compensator. 6M

(OR)

11. Obtain state model for the system with transfer function $\frac{Y(s)}{U(s)} = \frac{20}{s^3+6s^2+11s+6}$ 12M

AR13

CODE: 13CS2010 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-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 dangling pointer?
   b) Difference between Scope and Life Time of variable.
   c) What are Higher Order Functions?
   d) What is Recursion?
   e) What are primitive data types?
   f) Define data abstraction?
   g) What are formal and actual parameters with an example?
   h) Difference between High level language and Low level language?
   i) Explain about Early binding and Late binding?
   j) What is Inherited Attribute grammar?

PART-B

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

UNIT-I

2. a) What are Language Design Issues? 6M
   b) Define Compiler? Explain about the phases of compiler? 6M

(OR)

3. a) Distinguish BNF and EBNF with examples? 6M
   b) Discuss about Top down parser and Bottom up parser with examples? 6M

UNIT-II

4. a) Discuss in detail about Static allocation, Stack based allocation and Garbage allocation? 6M
   b) Explain about the concept of Binding Time? 6M

(OR)

5. Define Attribute Grammar? Discuss how an attribute grammar is used for simple assignment statements with computing of attribute values by using parse trees? 12M

UNIT-III

6. a) Compare Structured and Unstructured Control Flow constructs in various programming languages? 6M
   b) Explain about Logically controlled loops and Counter controlled loops with syntaxes and examples? 6M

(OR)

7. a) Define Array? List out Array Types and operations with examples? 6M
   b) Discuss about Pointer operations with syntaxes and examples? 6M

UNIT-IV

8. a) What are Parameter passing modes for subroutines? 6M
   b) Explain about the concept of Generic subprograms in C++ with an example program? 6M

(OR)

9. Discuss briefly about the implementation of Synchronization mechanism? 12M

UNIT-V

10. a) Differentiate the Classes and Inner Classes in Java language with examples? 6M
    b) Explain about OOPS principles? 6M

(OR)

11. Explain about the following in Scheme Language with examples? 12M
    a) Scheme Interpreter b) Quoting
    c) Predicate Functions d) Lambda Expressions
    e)Nested Scopes with let f) List search Functions

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