AR16

CODE: 16CE2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2018

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)	Define The terms i) Mass density ii) Surface tension iii) Capillarity	**6M**
	b)	Calculate the specific weight, mass density and specific gravity of an oil weighing 130KN and occupies a volume of $14m^3$	**8M**

(OR)

2.	a)	Describe the Buckingham's method of analysis	**6M**
	b)	If a certain liquid has a viscosity of 0.048 poise and kinematic viscosity 3.50 $X10^{-2}$ stokes. What is its specific gravity?	**8M**

UNIT-II

3.	a)	State Chezy's formula and mannings formula and explain the terms ?	**6M**
	b)	A trapezoidal channel has side slope 2 vertical to 3 horizontal. The discharge in the channel is 25m3/s under a bed slope of 1 in 2000. Design the most economical section in the channel using mannings formula N=0.01 ?	**8M**

(OR)

4.	a)	State difference between i) Steady and Unsteady flow ii) Laminar and turbulent flow in a open channel	**6M**
	b)	Derive the conditions for maximum discharge through a rectangular channel.	**8M**

UNIT-III

5.	a)	A nozzle of 50mm diameter delivers a stream of water at 20m/s perpendicular to a plate moves away from the jet at 5m/s. find (i) the force on the plate (ii) the efficiency of jet.	**6M**
	b)	Formulate an expression for the force exerted by a jet of water on a fixed curved plate in the direction of the jet, when jet strikes curved plate at one end tangentially.	**8M**

(OR)

6.	a)	Obtain an expression for the force exerted by the jet on flat vertical plate moving in the direction of jet.	**6M**

b) A jet of water of diameter 7.5cm strikes a curved plate at its centre with a velocity of 20m/s. the curved plate is moving with a velocity of 8m/s in the direction of the jet. The jet is deflected through an angle of 1650. Assuming the plate smooth find: **8M**

(i) force exerted on the plate in the direction of jet

(ii) power of the jet and (iii) efficiency of the jet.

UNIT-IV

7. a) Discuss about the constructional details and working principle of Francis Turbine? **6M**

b) In a Pelton turbine installation the level of water in the reservoir is 500m above the level of turbine the flow rate of water from the nozzle and the turbine is $2m^3$/sec the jet gets deflected by and angle of 165^0. If 20% of the head is lost in friction in the penstock determine the power given by the water to the runner and the hydraulic efficiency of the turbine? Speed ratio is 0.45? **8M**

(OR)

8. a) Discuss about the constructional details and working principle of Kaplan Turbine? **6M**

b) The outer diameter and hub diameter of the runner of a Kaplan turbine are 3.4m and 1.7m respectively. It develops 12MW power while working under a net head of 21m. The guide blade angle at the extreme edge of the runner is 35^0. At outlet the whirl is zero. The hydraulic efficiency of the turbine is 90% and overall efficiency is 85%. Find out the inlet and outlet vane angles of the runner near the outer periphery. **8M**

UNIT-V

9. a) Name the parts of a centrifugal pump and mention their functions **6M**

b) A Centrifugal Pump is running at 800rpm. The outlet vane angle of the impeller is 35^0 and velocity of flow at outlet is 3.5m/s. The discharge through the pump is 200lits / s when the pump is working against the head of 25m. If Manometric efficiency of the pump is 80% determine the i) Diameter of the impeller and ii) Width of the impeller at the outlet **8M**

(OR)

10. a) Discuss the concept of priming of centrifugal pump **6M**

b) The outer diameter of an impeller of a centrifugal pump is 400mm and outlet width 50mm. The pump is running at 700rpm and is working against a total head of 15m, the vanes angle at outlet is 30^0 and Manometric efficiency is 65%. Determine i) Velocity of flow at outlet ii) Velocity of water leaving the vane and iii) Angle made by the absolute velocity at outlet with the direction of motion at outlet. **8M**

AR16

CODE: 16BS2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2018

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) Show that $f(z)=e^z$ is analytic everywhere in the complex plane. **7**

   b) Show that $\left\{\frac{\partial}{\partial x}(|f(z)|)\right\}^2+\left\{\frac{\partial}{\partial y}(|f(z)|)\right\}^2=\{f^1(z)\}^2$ **7**

(OR)

2. Using Milne's method find the analytic function whose real part is $\frac{x}{x^2+y^2}$ **14**

UNIT-II

3. Evaluate $\int_{1+i}^{2+4i} z^2 dz$ along the straight line joining $1+i$ to $2+4i$ **14**

(OR)

4. Use Cauchy Integral formula $\int_C \frac{2z+1}{z^2+z}\,dz$ where C is the circle $|z|=\frac{1}{2}$ **14**

UNIT-III

5. Find the Laurent expansion of $f(z)=\frac{1}{(z+1)(z+3)}$ for $0<|z+1|<2$ **14**

(OR)

6. Express $f(z)=\frac{z}{(z-1)(z-3)}$ in series of positive and negative powers of $(z-1)$ **14**

UNIT-IV

7. Evaluate $\int_{-\infty}^{\infty}\frac{x^2-x+2}{x^4+10x^2+9}dx$ **14**

(OR)

8. Show by the method of residues $\int_0^{2\pi}\frac{d\theta}{2+\cos\theta}=\frac{2\pi}{\sqrt{3}}$ **14**

UNIT-V

9. Prove that $\int_0^{\infty}\sqrt{x}\,e^{-x^2}dx\times\int_0^{\infty}\frac{e^{-x^2}}{\sqrt{x}}dx=\frac{\pi}{2\sqrt{2}}$ **14**

(OR)

10. Evaluate $4\int_0^{\infty}\frac{x^2}{1+x^4}dx$ using $\beta-\gamma$ functions. **14**

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AR16

CODE: 16ME2012 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2018

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)	Compare and contrast Metallic, covalent and Ionic bonds, give examples.	8M
	b)	Discuss about the effect of grain boundaries on the properties of Metals/Alloys.	6M
		(OR)	
2.	a)	What types of defects arise in solids? Explain any two with Diagrams.	6M
	b)	Define Solidification and explain the steps involved in it.	8M

UNIT-II

3.	a)	Identify and explain the factors that control the solubility in alloy systems.	9M
	b)	Distinguish random and ordered Solid Solutions?	5M
		(OR)	
4.	a)	Differentiate between metal and alloy.	6M
	b)	Differentiate between Substitutional and Interstitial solid solutions.	8M

UNIT-III

5.		Draw the Fe-Fe_3C Diagram and label all the points, lines, temperatures and reactions.	14M
		(OR)	
6.		With a neat sketch explain eutectic alloy system.	14M

UNIT-IV

7.	a)	Explain in detail about i. Tool Steel ii. Stainless Steel	10M
	b)	Explain the differences between Hypoeutectic and hypereutectic Cast irons	4M
		(OR)	
8.	a)	Explain in detail regarding composition, microstructure, properties and applications of i. Grey Cast Iron ii. Malleable Cast Iron	10M
	b)	Explain the differences between hypo eutectoid and hypereutectoid steels.	4M

UNIT-V

9.	a)	Explain the following Heat Treatment Methods i. Normalising ii. Carburising	8M
	b)	Discuss two different methods of powder production.	6M
		(OR)	
10.	a)	Explain in detail about TTT diagram with transformations of austenite into martensite.	8M
	b)	Explain different stages of manufacturing of powder metallurgy component.	6M

AR16

CODE: 16EC2012 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2018

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) If a mass function is given by **8M**

$$P(x) = \begin{cases} Ax & ; x = 1,2,.....50 \\ A(100 - x) & ; x = 51,52....100 \\ 0 & ; \text{otherwise} \end{cases}$$

a) Find A that makes the function a p.m.f and sketch its graph.
b) Find P(x>50), P(x<50),P(25<x<75) and P(x-as odd number)
c) (i) If the events indicated in (ii) are A,B,C,D respectively find P(A/B); P(A/C);P(A/D);P(C/D).

b) The quarterback for a certain football team has a good game with probability 0.6 and a bad game with probability 0.4.When he has a good game, he throws at least one interception with a probability of 0.2; and when he has a bad game, he throws at least one interception with a probability of 0.5. Given that he threw at least one interception in a particular game, what is the probability that he had a good game? **6M**

(OR)

2. a) Define probability,sample space,mutually exclusive events exhaustaive events with examples. **8M**

b) Let two honest coins, marked 1 and 2, be tossed together. The four possible outcomes are *T*1*T*2, *T*1*H*2, *H*1*T*2, *H*1*H*2. (*T*1 indicates toss of coin 1 resulting in tails; similarly *T*2 etc.) We shall treat that all these outcomes are equally likely; that is the probability of occurrence of any of these four outcomes is 1/4. (Treating each of these outcomes as an event, we find that these events are mutually exclusive and exhaustive). Let the event *A* be 'not *H*1*H*2 ' and *B* be the event 'match'. (Match comprises the two outcomes *T*1*T*2, *H*1*H*2). Find *P* (*B*|*A*). Are *A* and *B* independent? **6M**

UNIT-II

3. a) Determine whether the following is a valid distribution function or not and find the corresponding density function **7M**

$$F_X(x) = \begin{cases} 1 - e^{\frac{-x}{2}}; & for\ x \geq 0 \\ 0 & ; otherwise \end{cases}$$

b) A random variable X has the following density function. Find 'k' and CDF of X. Also find P[1<X≤3]. **7M**

$$f_X(x) = \begin{cases} \frac{k}{4}\ 0 < x < 2 \\ \frac{1}{2}, 2 < x \leq 3 \end{cases}$$

(OR)

4. a) Find the mean and variance of a uniform density function. **8M**

$$f_x(x)=\begin{cases}\dfrac{1}{b-a} & a < x < b\\ 0 & \text{otherwise}\end{cases}$$

b) The density function of a random variable is given as $f_x(x)=a\ c^{-bx}$ $x\geq 0$.Find the characteristic function and first two moments. **6M**

UNIT-III

5. a) State and prove the properties of Co variance **6M**

b) Let X and Y be jointly continuous random variables with joint density function **8M**

$$f_X(x)=\begin{cases}xye^{-\left(\frac{x^2+y^2}{2}\right)} & for\ x>0\ and\ y>0\\ 0 & otherwise\end{cases}$$

(i)Check whether x and y are independent.

(ii) Find P ($x\leq 1$, $y\leq 1$).

(OR)

6. a) Define joint characteristic function. Obtain the joint characteristic function of X and Y if **7M**

$$f_{XY}(x,y)=\frac{1}{2\pi}e^{-\left(\frac{x^2+y^2}{2}\right)}$$

b) Gaussian random variables X and Y have first and second order moments **7M**
$m_{10}=-1.1$, $m_{20}=1.16$, $m_{01}=1.5$,$m_{02}=2.89$,$R_{XY}=-1.724$. Find C_{XY}, ρ?

UNIT-IV

7. a) A random process is given by x(t)=At, where A is an uniform distributed random variable on (0,2) find whether X(t) is WSS or not. **7M**

b) If $Y_1(t)=X_1\cos\omega t+X_2\sin\omega t$ **7M**
$Y_2(t)=X_1\sin\omega t+X_2\cos\omega t$
Where X_1 and X_2 are zero means independent random variables with unity variance. Show that the random processes $Y_1(t)$ and $Y_2(t)$ are individually WSS but not jointly WSS.

(OR)

8. a) Define autocorrelation function of a random process sand prove its properties**.** **7M**

b) Two WSS random process are defined by **7M**

$$X(t)=A\cos(\omega_0 t)+B\sin(\omega_0 t)$$

$$Y(t)=B\cos(\omega_0 t)-A\sin(\omega_0 t)$$

Where ω_0 is constant and A, B are uncorrelated zero mean random variables. Show that X(t) and Y(t) a jointly WSS.

UNIT-V

9. a) Derive the expression for cross power density spectrum of a random process **7M**

b) Determine the autocorrelation function of the random process with the power spectral density given by **7M**

$$S_{XX}(w)=\begin{cases}S_0 & |w|<w_0\\ 0 & \text{otherwise}\end{cases}$$

(OR)

10. a) State and prove the properties of Power Spectral Density **7M**

b) Let $Y(t)=X(t)+N(t)$ be a wide-sense stationary process where $X(t)$ is the actual signal and $N(t)$ is a zero-mean noise process with variance σ^2 and independent of $X(t)$. Find the power spectral density of $Y(t)$. **7M**

AR16

CODE: 16CS2010 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2018

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)	Describe the classification of programming languages.	**7M**
	b)	Why is it useful for a programmer to have some background in language design, even though he or she may never actually design a programming language?	**7M**
		(OR)	
2.	a)	Explain in detail about BNF and EBNF	**7M**
	b)	Explain the primary uses of methodology and notation for describing the semantics of programming language.	**7M**

UNIT-II

3.	a)	Describe about the principle of storage allocation mechanisms.	**7M**
	b)	Discuss about the importance of the Name, Scope and Binding in Programming Language.	**7M**
		(OR)	
4.	a)	What are the general problems with static scoping?	**7M**
	b)	Explain about the role of semantic analyzer.	**7M**

UNIT-III

5.	a)	Describe the different categories of control flow mechanisms.	**7M**
	b)	Explain about control flow in Recursion.	**7M**
		(OR)	
6.	a)	How pointers are implemented in Pascal?	**7M**
	b)	Explain about set data types.	**7M**

UNIT-IV

7.	a)	Discuss about various parameter passing methods with suitable examples.	**7M**
	b)	Explain about design issues for functions	**7M**
		(OR)	
8.	a)	Explain about Generic subroutines and modules.	**7M**
	b)	What is exception? Explain in detail about handling of exceptions.	**7M**

UNIT-V

9.	a)	Describe the issues of object oriented programming languages.	**7M**
	b)	Explain about inheritance in c++ and java.	**7M**
		(OR)	
10.	a)	Explain the concept of Encapsulation.	**7M**
	b)	Explain about the pure virtual method in C++ with an example.	**7M**

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AR13

CODE: 13CE2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2018

HYDRAULICS AND HYDRAULIC MACHINERY

(Civil Engineering)

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

PART-A

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

1 Briefly explain the following
- a) Rayleigh's method
- b) Superfluous
- c) Type of channels
- d) Non uniform flow
- e) Applications of curved vanes
- f) Applications of radial flow turbines
- g) Classification of turbines
- h) Geometric similarity
- i) Manometric head
- j) Characteristic curves

PART-B

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

UNIT-I

2. The efficiency η of a fan depends on density ρ and viscosity μ of fluid, angular velocity ω, diameter D and discharge Q. Obtain a functional relationship for η in terms of dimensionless parameters **12 M**

(OR)

3. What are the various dimensionless numbers? Also define and give the expressions for them **12 M**

UNIT-II

4. For a constant specific energy of 1.8 N.m/N, calculate the maximum discharge that may occur in a rectangular channel 5.0 m wide **12 M**

(OR)

5. a What are the various surface profiles that may occur? Explain in detail with sketches **4 M**
   b Explain in detail the procedure involved in the computation of critical depth with examples. **8 M**

UNIT-III

6. Derive an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet? **12 M**

(OR)

7. A jet of water of diameter 50mm, 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° to the direction of motion of vane at outlet. **12 M**

Determine

(i) The force exerted by the jet vane in the direction of motion

(ii) Work done per second by jet

AR13

CODE: 13CE2007 SET-2

UNIT-IV

8.	a)	Write a short notes on the types of draft and their importance in reaction turbines	**6 M**
	b)	A single jet pelton turbine is required to drive generator (4 pole) to develop 10 MW. The available head at the nozzle is 762m. Assuming electric generator efficiency 95 %. Pelton wheel efficiency 87 %, coefficient of velocity for nozzle 0.97, mean bucket 15° and the friction of the bucket reduces the relative velocity by 15 percent, find a) the diameter of the jet and b) the rate of flow of water through the turbine c) the force exerted by the jet on the buckets. If the ratio of mean bucket circle diameter to the jet diameter is not to be less than 10, find the best synchronous speed for generation at 50 cycles per second and the corresponding mean diameter of the runner.	**6 M**

(OR)

9.	a)	What is hydroelectric power plant	**6 M**
	b)	Define and explain about heads and efficiencies of a turbine.	**6 M**

UNIT-V

10.	a)	Explain the term 'Cavitation' with respect to pumps	**6 M**
	b)	Discuss about the efficiencies of Centrifugal pump	**6 M**

(OR)

11.	a)	Explain the performance characteristic curves of turbine	**6 M**
	b)	A four stage centrifugal pump has four identical impeller, keyed to the same shaft. The shaft is running at 400 rpm and the total manometric head developed by the multistage pump is 40 m. the discharge through the pump is 0.2 m^3/sec. the vane of each impeller having outlet angle as 45^0, if the width and diameter of each impeller at outlet is 5 cm and 60 cm resp., find the manometric efficiency.	**6 M**

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AR13 SET-2

Code: 13EE2012

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2018

POWER SYSTEMS-I

(Electrical and Electronics Engineering)

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

PART-A

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

1. (a) What are the functions of economizer in thermal power stations
   (b) State the applications of penstock used in hydro power stations
   (c) State the types of nuclear reactors
   (d) Differentiate open cycle and closed cycle gas turbine plants
   (e) Classify distribution system
   (f) Differentiate indoor and outdoor substations
   (g) Define diversity factor
   (h) Define two-part tariff
   (i) State the types of cables
   (j) State the types of gas insulated substations

PART-B

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

UNIT – I

2. Write short notes on the following used in thermal power stations
   i) Air pre-heater ii) Condenser iii) Cooling tower iv) Fuel handling system

(OR)

3. It has been assessed in a hydro electric power plant that a minimum run off of 95 m^3/Sec will be available with a head of 40mt. Find out the firm capacity and yearly gross output

UNIT – II

4. Describe the methods to improve the thermal efficiency of gas turbine plant

(OR)

5. Explain with a simple block diagram working of nuclear power station

Code: 13EE2012

UNIT –III

6. a) Compare AC and DC distribution [4M]
   b)Explain DC distributor with concentrated loads fed at one end [8M]

(OR)

7. Explain 33/11kV substation with line diagram

UNIT –IV

8. A power supply is having the following loads

Type of load	Max demand factor(kW)	Diversity of group	Demand factor
Domestic	15000	1.25	0.7
Commercial	25000	1.2	0.9
Industrial	50000	1.3	0.98

   If the overall system diversity factor is 1.5, determine
   i) The maximum demand and
   ii) Connected load of each type.

(OR)

9. Describe various types of tariffs

UNIT-V

10. Estimate the charging current drawn by a cable with three cores and protected by a metal sheath when switched on to an 11kV, 50Hz supply. The capacitance between two cores with the third core connected to the sheath is measured to be 3.7μF.

(OR)

11. a) State the disadvantages of gas insulated sub stations [4M]
    b) Explain gas insulated substations with single line diagram [8M]

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AR13

CODE: 13ME2009 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, July-2018

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 meant by turning rolling pairs?
   b) Explain Grubler's criteria for determining degree of freedom for mechanism.?
   c) What is an inversion?
   d) What is Coriolis acceleration component?
   e) Give any examples for an approximate straight line mechanism
   f) What is velocity of rubbing?
   g) What is instantaneous centre of rotation?
   h) What is the difference between cycloidal and involute tooth forms?
   i) Explain what is interference.
   j) Explain the terms Pressure angle and addendum

PART-B

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

UNIT-I

2. a) What is an inversion? Explain the different inversions of the slider crank chain. 7M
   b) Illustrate different types of Kinematic pairs with the aid of neat sketches 5M

(OR)

3. A Crank Rocker mechanism ABCD has the dimensions AB=30mm, BC=90mm, CD=75mm, AD (fixed link) = 100mm.Determine the maximum and minimum values of the transmission angle. Locate the toggle positions and indicate the corresponding crank and transmission angles 12M

UNIT-II

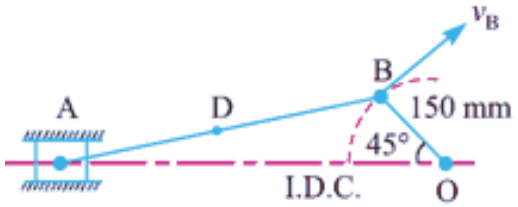
4. a) Distinguish (by neat sketches) between Peaucellier mechanism and Hart mechanism. 8M
   b) What are the limitations of a Scott-Russel mechanism? 4M

(OR)

5. a) Derive an expression for the ratio of angular velocities of the shafts of a Hooke's joint. 9M
   b) What are the advantages of Davis steering gear over Ackermann steering gear. 3M

UNIT-III

6. a) The crank of a slider crank mechanism rotates clockwise at a constant speed of 300 r.p.m. The crank is 150 mm and the connecting rod is 600 mm long. Determine: 1. Linear velocity of the midpoint of the connecting rod, and 2. angular velocity of the connecting rod, at a crank angle of 45° from inner dead centre position. 7M



   b) Define Kennedy's theorem. How is it useful to find out the instantaneous centers of a Mechanism 5M

(OR)

7. The oscillating link OAB of a mechanism shown in figure below is pivoted at O and is moving at 90 r.p.m. anti-clockwise. If OA=15 cm, AB=7.5 cm and AC=25 cm, then calculate: (i) the velocity of the block C, (ii) angular velocity of the link AC and (iii) the rubbing velocities of the pins at O,A and C assuming that these pins are of equal diameter of 2 cm. The oscillating link OAB makes an angle of 15 with the vertical 12M

UNIT-IV

8. Layout the profile of a cam so that the follower 12M
   - is moved outwards through 30 mm during 180° of cam rotation with SHM
   - dwells for 20° of the cam rotation.
   - returns with SHM during the remaining 160°of the cam rotation.

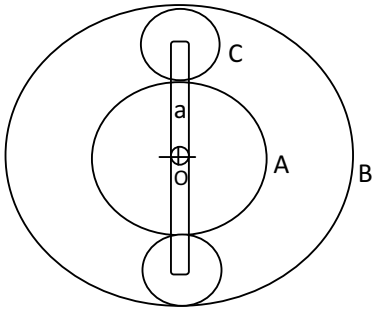
   The base circle diameter of the cam is 28 mm and the roller diameter 8 mm. the axis of the follower is passing through centre of cam.

(OR)

9. a) Draw the neat sketch of a cam and follower and define the various terms used in the cam profile. 6M
   b) Compare the performance of knife edge, roller and mushroom followers 6M

UNIT-V

10. a) What is the sun and planet gear? Give the procedure to analyze such a gear train? 5M
    b) An epicyclic gear train is shown in the Figure (2) the number of teeth on A and B are 80 and 200. Determine the speed of the arm a 7M
    (i) if A rotates at 100 rpm clockwise and B at 50 rpm counter-clockwise.
    (ii) if A rotates at 100 rpm clock wise and B is stationary



(OR)

11. a) Derive an expression for the velocity of sliding between a pair of involute teeth. 6M
    State the advantages of involute profile as a gear tooth profile
    b) What is standard system of gears? How does it ensure interchangeability of gears? 6M

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AR13 SET-1

Code: 13EE2013

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2018

LINEAR CONTROL SYSTEMS

(Electronics and Communication Engineering)

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

PART-A

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

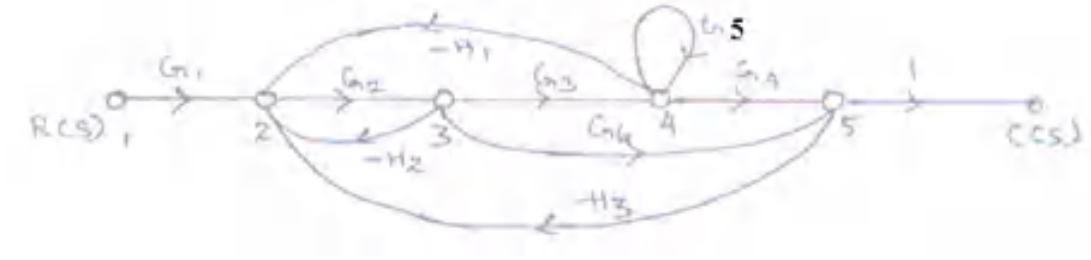
1. a) Define control systems
   b) Write any two rules for block diagram reduction.
   c) Write the standard form of transfer function of second order system .
   d) What are the applications of synchros.
   e) Define rise time.
   f) Draw the approximate polar plot for the function $G(s)H(s) = \frac{1}{s^2(1+Ts)}$.
   g) What are the effects of PI Controller?
   h) What is the need of compensation in Control Systems?
   i) What is phase margin and gain cross-over frequency?
   j) Define Nyquist stability criteria?

PART-B

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

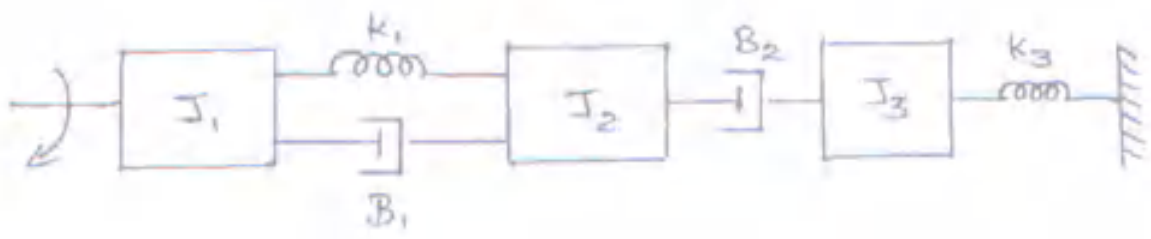
UNIT-I

2. Find the overall gain of the signal flow graph. [12M]



(OR)

3. Write the differential equation governing the mechanical rotational system shown And also find transfer function. [12M]

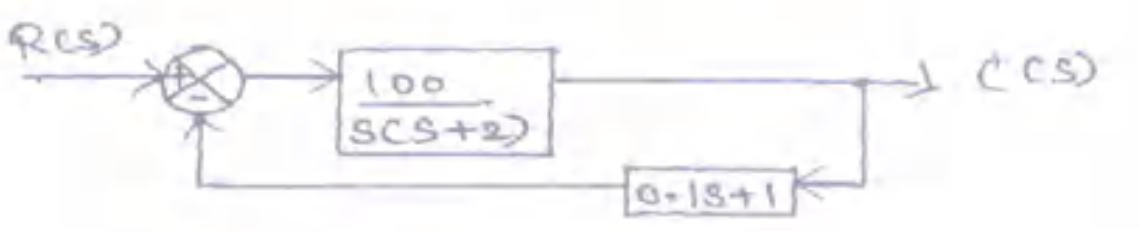


UNIT-II

4. Derive the transfer function and develop the block diagram of armature controlled DC servo motor. **[12M]**

(OR)

5.A positional control system with velocity feedback is shown. Determine the response of the system for unit step input. **[12M]**



UNIT-III

6.(a) Using R-H criterion determine the stability of the system with the following characteristic equation. Also find the number of poles located in the right half of S-plane. **[6M]**

$$F(S) = 5s^6+8s^5+12s^4+20s^3+100s^2+150s+120.$$

(b) Determine the stability of a system having following characteristic equation

$$S^6+s^5+5s^4+3s^3+2s^2-4s-8=0.$$ **[6M]**

(OR)

7. Sketch the complete root locus for the system having $G(s)H(s) = \frac{K}{s(s+2)(s+3)}$.

Determine the range of K for which the system is stable. **[12M]**

UNIT-IV

8. Draw the bode plot for the system having $G(S)H(S) = \frac{10(0.2S+1)}{(S+1)(0.1S)(0.01S+1)}$. find gain and phase crossover frequency. **[12M]**

(OR)

9. Sketch the polar plot of a system given by $G(S) = \frac{100}{S(1+0.5S)(1+0.1S)}$. if the plot crosses the real axis, determine the corresponding frequency and magnitude. **[12M]**

UNIT-V

10. (a) Obtain the state model for the system described by $\frac{Y(s)}{U(s)} = \frac{1}{s^3+6s+5}$. **[6M]**

(b) Obtain the state model for the system described by the Transfer Function

$$G(s) = \frac{2}{s^3+6s^2+11s+9}.$$ **[6M]**

(OR)

11. (a) Derive the expression for the transfer function $G(s) = \frac{Y(s)}{U(s)}$. Given the state model as

$$\dot{x}(t) = Ax(t) + Bu(t)$$
$$y(t) = Cx(t) + Du(t)$$ **[6M]**

(b) Define controllability and observability. Check whether the system represented by

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 6 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$$ is controllable or not? **[6M]**

AR13 SET-1

Code: 13CS2010

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, July-2018

PRINCIPLES OF PROGRAMMING LANGUAGES

(Common to CSE & IT)

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

PART-A

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

1. a) Define Regular Expression?.
   b) Write an example for multi way selection?.
   c) Write difference between class and object?.
   d)What is Type checking?.
   e) Write the difference between actual parameters and formal parameters?.
   f) Write the difference between oops & obps?.
   g) Define Encapsulation?.
   h) Define message passing?.
   i) What are the drawbacks of operator overloading?.
   j) Define coercion?.

PART- B

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

UNIT-I

2. a) What is the difference between a phase and a pass of compilation? Under what circumstances does it make sense for a compiler to have multiple passes? [6M]

   b) What does it mean for a context-free grammar to be ambiguous? [6M]

(OR)

3. a) What are the main features of the programming paradigm with examples? [6M]
   b) Explain about Top-Down and Bottom-Up passing with suitable example. [6M]

UNIT-II

4. a) What do we mean by the scope of a name-to-object binding? Explain about the closest nested scope rule. [6M]

   b) Explain the distinction betweendecisions that are bound statically and those that are bound dynamically. What is the advantage of binding things as early as possible? What are the advantages of delaying bindings? [6M]

(OR)

5. a) Describe in detail about evaluating attributes for the expression (1 + 3)*2. [6M]

   b) Explain in detail about object lifetime and space management?. [6M]

AR13 SET-1

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UNIT-III

6. Explain in detail about the following Control Flows with examples. [4M+4M+4M]
   a) Sequencing
   b) Iteration
   c) Recursion

(OR)

7. Explain in detail the following data types: [3M+3M+3M+3M]
   a) array
   b) lists
   c) record
   d) union and pointer

UNIT-IV

8. a) In what ways may an enumeration type be preferable to a collection of named constants? In what ways may a sub range type be preferable to its base type? In what ways may a string be preferable to an array of characters? [6M]

   b) Explain the distinction betweendecisions that are bound statically and those that are bound dynamically. What is the advantage of binding things as early as possible? What is the advantages of delaying bindings? [6M]

(OR)

9. Discuss about the concurrency control with examples. [12M]

UNIT-V

10. a) Compare Java final methods with C++ non-virtual methods. How are they same? How are they different? [6M]
    b) Explain why in-line subroutines are particularly important in object-oriented languages. [6M]

(OR)

11. a) Define horn clause with an example. What sorts of logical statements cannot be captured in horn clauses? Also describe the generate-and-test programming idiom. [6M]
    b) What is a metaclass in smalltalk?Explain the difference between initialization and assignment in C++ with suitable examples. [6M]

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