

AR16

CODE: 16CE2007

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B.Tech II Semester Regular Examinations, April, 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 a) Viscosity b) Cohesion c) Adhesion **6M**
b) State and describe Buckingham π -method. **8M**
(OR)
2. a) Describe the Rayleigh's method of analysis **6M**
b) Show that the velocity through a circular orifice is given by **8M**

$$V = \sqrt{2gH} \phi \left[\frac{D}{H}, \frac{\mu}{\rho V H} \right]$$

Where V is the velocity of flow through a circular orifice of diameter D under a head of H. ρ and μ are the density and viscosity of fluid.

UNIT-II

3. a) State difference between flow through pipes and flow through channels. **6M**
b) Find the bed slope of trapezoidal channel of bed width 5m and side slope of 2 horizontal to 1.0 vertical. The discharge through the channel is 45 m³/ sec and depth of water in the channel is 2.5 m . Take N= 0.02 i manning formula **8M**
(OR)
4. a) Explain the terms Economical channel section, hydraulic mean depth, wetted perimeter, hydraulic depth **6M**
b) Derive the conditions for the most economical section of a Trapezoidal section **8M**

UNIT-III

5. a) Define impulse momentum principle **6M**
b) Two jets strike the buckets of a pelton wheel, which is having shaft power 15450KW.the diameter of each jet is given as 200 mm.if the net head on the turbine is 400m,find the overall efficiency of the turbine .take $C_v=1$. **8M**

(OR)

6. a) Name Some Applications of a radial flow turbine **6M**
 b) A pelton wheel has a mean bucket speed of 35m/s with a jet of water flowing at the rate of 1 m³/s under a head of 270m. The buckets deflect the jet through an angle of 170°. Calculate the power delivered to the runner and the hydraulic efficiency of the turbine. Assume co-efficient of velocity as 0.98. **8M**

UNIT-IV

7. a) Paraphrase about governing of turbines. **6M**
 b) A Kaplan turbine working under a head of 20m develops 11772 KW shaft power. The outer diameter of the runner is 3.5m and hub diameter is 1.75m. The guide blade angle at the extreme edge of the runner is 35°. The hydraulic and overall efficiencies of the turbines are 88% and 84% respectively. If the velocity of whirl is zero at outlet, determine: (i) runner vane angles at inlet and outlet at the extreme edge of the runner (ii) speed of the turbine. **8M**

(OR)

8. a) Discuss the terms 1) overall efficiency 2) shaft power 3) waterpower d) Net head of a Kaplan turbine **6M**
 b) Design a Pelton turbine to meet the following the particulars: **8M**
- | | |
|-------------------------|--------|
| Overall efficiency | 75% |
| Coefficient of Velocity | 0.885 |
| Speed ratio | 0.35 |
| Shaft power | 500kW |
| Speed | 200rpm |
| Net head | 200m |

UNIT-V

9. a) Formulate expression for work done by the centrifugal pump. **6M**
 b) A Centrifugal Pump is running at 800rpm. The outlet vane angle of the impeller is 35° 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) Enumerate the different types of efficiencies of centrifugal pump. **6M**
 b) A centrifugal pump is to discharge 0.118m³/s at a speed of 1450rpm against a head of 25m. The impeller diameter is 250mm, its width at outlet is 50mm, and Manometric efficiency is 75%, Determine the vane angle at the outer periphery of the impeller? **8M**

AR16

CODE: 16BS2007

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B.Tech II Semester Regular Examinations, April, 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. Show that the function $f(z) = \sqrt{xy}$ is not analytic at the origin, although C-R equations are satisfied at that point. **14M**

(OR)

2. a) Find all values of k , such that $f(z) = e^x (\cos ky + i \sin ky)$ is analytic. **7M**
b) Using Milne - Thompson method to find an analytic function whose real part is $e^{-x} (x \sin y - y \cos y)$ **7M**

UNIT-II

3. Verify Cauchy's theorem for the integral of z^3 taken over the boundary of the rectangle with vertices $-1, 1, 1+i, -1+i$ **14M**

(OR)

4. a) Evaluate $\int_C \frac{e^{2z}}{(z+1)^4} dz$ around $C: |z-1|=3$ **7M**
b) Evaluate $\int_{1-i}^{2+i} (2x+1+iy) dz$ along $(1-i)$ to $(2+i)$ **7M**

UNIT-III

5. Expand $f(z) = \frac{1}{(z+2)(1+z)^2}$ in the region (i) $|z| < 2$, (ii) $|1+z| > 1$. **14M**

(OR)

6. a) Define zero, pole of order m, essential singularity of an analytic function **7M**

b) Find the Laurent expansion of $\frac{1}{z^2 - 4z + 3}$ for $1 < |z| < 3$. **7M**

UNIT-IV

7. Find the residues of $f(z) = \frac{z^2}{(z-1)^2(z+2)}$ at each pole. **14M**

(OR)

8. Using complex variable technique evaluate **14M**

$$\int_0^\pi \frac{d\theta}{a + b \sin \theta} = \frac{\pi}{\sqrt{a^2 - b^2}} \quad (a > b > 0)$$

UNIT-V

9. Prove that $\int_0^1 \frac{x^2}{\sqrt{1-x^4}} dx \times \int_0^1 \frac{1}{\sqrt{1-x^4}} dx = \frac{\pi}{4}$ **14M**

(OR)

10. a) Evaluate $\int_0^1 x^3 \sqrt{1-x} dx$ using β and Γ functions **7M**

b) Evaluate $\int_0^{\frac{\pi}{2}} \sin^5 \theta \cos^{\frac{7}{2}} \theta d\theta$ **7M**

AR16

CODE: 16ME2012

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B.Tech II Semester Regular Examinations, April, 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) Explain the crystallization of Metals. **4 M**
b) What is an ionic bond? Explain with an example. Also give characteristics of ionic solid. **10 M**

(OR)

2. a) Explain the reasons to study the crystal structure of metals. **4 M**
b) What is the effect of grain boundary on properties of metals or alloys ? **10 M**

UNIT-II

3. a) Discuss Hume Rothery rules of solid solubility in detail. **7 M**
b) What is solid solution? With suitable example explain different types of solid solutions. **7 M**

(OR)

4. a) Explain any two of the following cooling curves with neat sketch indicating various salient points on it: **10 M**
i) Pure metal ii) Solid solution and iii) Eutectic alloy
b) Why are alloys produced? Explain why alloys find more applications than pure metals. **4 M**

UNIT-III

5. a) With neat sketch explain the Iron-carbon equilibrium diagram showing all the salient features. **7 M**
b) Explain the effect of the following elements on Iron-Iron carbon system. **7 M**
i) Chromium ii) Vanadium and iii) Nickel.

(OR)

6. a) Briefly explain the classification of phase diagrams based on the solubility in liquid and solid states. **7 M**
b) With a neat sketch explain isomorphous alloy system? **7 M**

UNIT-IV

7. a) Explain properties, advantages and applications of following : **14 M**
a) Tool steels (b) Die steels (c) Hadfield Manganese steel (d) High alloy steels

(OR)

8. a) What are cast Irons? Give the importance of cast irons in the metallurgical curriculum. **7 M**
b) Explain the microstructure and applications of White Cast Iron. **7 M**

UNIT-V

9. a) Distinguish between Carburizing and Nitriding. **7 M**
b) Explain annealing, hardening heat treatment methods and explain TTT diagrams. **7 M**
10. a) What are various characteristics of metal powders? Explain them in detail. **7 M**
b) Distinguish between Austempering and Martempering. **7 M**

**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) How do you explain statistically independent events using Baye's rule? **7M**
- b) A company producing electric relays has three manufacturing plants producing 50, 30 and 20 percent respectively of its product. Suppose the probabilities that a relay manufactured by these plants is defective are 0.02, 0.05 and 0.01 respectively. **7M**
 - i) If a relay is selected at random from the output of the company, what is the probability that it is defective?
 - ii) If a relay selected at random is found to be defective, what is the probability that it was manufactured by plant 2?

(OR)

2. a) Define joint probability, conditional probability, mutually exclusive events with examples. **7M**
- b) Let two honest coins, marked 1 and 2, be tossed together. The four possible outcomes are T_1T_2 , T_1H_2 , H_1T_2 , H_1H_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_1H_2 ' and B be the event 'match'. (Match comprises the two outcomes T_1T_2 , H_1H_2). Find $P(B|A)$. Are A and B independent? **7M**

UNIT-II

3. a) The random variable X has the discrete variable in the set $\{-1, 0.5, 0.7, 1.5, 3\}$, the corresponding probabilities are assumed to be $\{0.1, 0.2, 0.1, 0.4, 0.2\}$ plot its distribution function and density function. **7M**
- b) Find the second central moment of a random variable with PDF $f_X(x) = ae^{-ax}u(x)$ **7M**

(OR)

4. a) In a restaurant the waiting time for a customer to catch the attention of a waiter is X and is specified by the following distribution function. Compute the probability that the customer will have to wait **7M**
 - i) between 5 and 10 minutes, ii) at least 10 minutes.

$$F_X(x) = \begin{cases} \left(\frac{x}{2}\right)^2 & \text{for } 0 \leq x \leq 1, \\ \frac{x}{4} & \text{for } 1 \leq x \leq 2, \\ \frac{1}{2} & \text{for } 2 \leq x \leq 10, \\ \frac{x}{20} & \text{for } 10 \leq x \leq 20, \\ 1 & \text{for } x \geq 20. \end{cases}$$

- b) Obtain the moment generating function for uniformly distributed random variable in the interval [c,d]. 7M

UNIT-III

5. a) The joint density function for X and Y is 7M

$$f_{X,Y}(x,y) = \begin{cases} \frac{xy}{9} & \text{for } 0 < x < 2, 0 < y < 3 \\ 0 & \text{otherwise} \end{cases}$$

Find the conditional density functions.

- b) Define Joint central moments of the random variables X and Y. Obtain the expressions for covariance, correlation coefficient and also obtain C_{XY} when X and Y are i) uncorrelated ii) orthogonal 7M

(OR)

6. a) Given two random variables X and Y with the joint CDF $F_{XY}(x, y)$ and marginal CDFs $F_X(x)$ and $F_Y(y)$, respectively, compute the joint probability that X is greater than a and Y is greater than b. 7M
- b) Gaussian random variables X and Y have first and second order moments $m_{10}=-1.1$, $m_{20}=1.16$, $m_{01}=1.5$, $m_{02}=2.89$, $R_{XY}=-1.724$. Find C_{XY} , ρ ? 7M

UNIT-IV

7. a) With neat sketches explain the classification of random process based on time t and amplitude of random variable x. 7M
- b) Consider a random process $X(t)=A \cos(\omega t)$, where ω is a constant and A is a random variable uniformly distributed over (0,1). Find the auto correlation and auto covariance of X(t). 7M

(OR)

8. a) State auto correlation function and mention its properties with proofs.. 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.

UNIT-V

9. a) Find the PSD of a stationary random process for which auto correlation is $R_{xx}(\tau) = 6e^{-a|\tau|}$. 7M
- b) Derive the expression for power density spectrum of a random process. 7M
- (OR)
10. a) State and prove Wiener-Khintchine relations with reference to a random process. 7M
- b) State and prove the properties of PSD. 7M

AR16

CODE: 16CS2010

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

II B.Tech II Semester Regular Examinations, April, 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) Explain the areas of computer applications and their associated languages. **7M**
b) Explain the role of symbol table in a compiler with suitable example. **7M**
(OR)
2. a) Explain about the compilation phases scanning and parsing with examples. **7M**
b) Distinguish between static and dynamic semantics. **7M**

UNIT-II

3. a) Explain the concept of binding with suitable examples. **7M**
b) Explain about macro expansion? **7M**
(OR)
4. a) Explain the Attribute Grammar and also explain about the features of the same. **7M**
b) Differentiate in detail about Synthesized attributes and inherited attributes **7M**

UNIT-III

5. a) Explain about structured and unstructured control flow. **7M**
b) What is Iteration? Explain the Iteration objects in C++ **7M**
(OR)
6. a) Explain about type checking. Give examples. **7M**
b) Discuss about files. **7M**

UNIT-IV

7. a) Explain about the subroutines as a parameters in Pascal with an example. **7M**
b) What are the design issues for subprograms? **7M**
(OR)
8. a) Explain about the generic sub routines with an example. **7M**
b) Explain Exception Handling in C++. **7M**

UNIT-V

9. a) What are the benefits of data abstraction. **7M**
b) What are inheritance and multiple inheritances? Explain with examples. **7M**
(OR)
10. a) Explain about the virtual and non virtual methods. Also explain the virtual methods in C++ . **7M**
b) Explain about dynamic method binding. **7M**

RA / AR16

CODE: 16OE2011

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular Examinations, April, 2018

OPEN ELECTIVE

MATRICES AND APPLICATIONS

(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 Reduce the matrix to Echelon Form and determine the rank of the matrix 7M

$$\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \end{bmatrix}$$

- b Show that the equations $x - 3y - 8z + 10 = 0$; $3x + y - 4z = 0$; $2x + 5y + 6z = 13$ are consistent and then solve them. 7M

(OR)

2. a Solve the system of equations by using matrix inversion method. 7M

$$x + 2y + 3z = 1;$$

$$2x + 3y + 8z = 2;$$

$$x + y + z = 3$$

- b Use Gauss-Seidal iteration method to solve the system 7M

$$10x + y + z = 12;$$

$$2x + 10y + z = 13;$$

$$2x + 2y + 10z = 14$$

UNIT-II

3. Determine the Eigen values and Eigen vectors of the matrix 14M

$$\begin{bmatrix} 5 & -2 & 0 \\ -2 & 6 & 2 \\ 0 & 2 & 7 \end{bmatrix}.$$

(OR)

4. Verify Cayley -Hamilton theorem for $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ also find A^{-1} 14M

and A^4 .

UNIT-III

5. Use LU decomposition to solve the system of equations 14M
 $2x + 4y - 6z = -4;$
 $x + 5y + 3z = 10;$
 $x + 3y + 2z = 5.$

(OR)

6. a Determine the Eigen value and Eigen vector of the matrix $\begin{bmatrix} 1 & 2 & 1 \\ -4 & 7 & 1 \\ -1 & -2 & -1 \end{bmatrix}$ 7M

- b Write QR decomposition of the matrix $\begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$ 7M

UNIT-IV

7. Determine the rank, index, signature and nature of the quadratic form 14M
 $6x^2 + 3y^2 + 3z^2 - 4xy + 4xz - 2yz$ and reduce it in its canonical form.

(OR)

8. Reduce the given quadratic form $2x^2 + y^2 + z^2 + 2xy - 2xz - 4yz$ to its 14M
canonical form by orthogonal reduction Determine the rank, index, signature
and nature of the quadratic form .

UNIT-V

9. a Write a MATLAB code to solve the system of equations 7M
 $a_{11}x + a_{12}y + a_{13}z = b_1;$
 $a_{21}x + a_{22}y + a_{23}z = b_2;$ by using gauss elimination method.
 $a_{31}x + a_{32}y + a_{33}z = b_3$

- b Write a MATLAB code to solve the system of equations 7M
 $2x + y + z = 10;$
 $3x + 2y + 3z = 18;$ by using gauss elimination method.
 $x + 4y + 9z = 16;$

(OR)

10. a Write a MATLAB code to find Eigen values and Eigen vectors of the 7M
matrix $\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}.$

- b Write a MATLAB code to find Eigen values and Eigen vectors of the 7M
matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}.$

Code: 13CE2007**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech II Semester Supplementary Examinations, April, 2018****HYDRAULICS AND HYDRAULIC MACHINERY
(Civil Engineering)****Time: 3 Hours****Max Marks: 70****PART-A****Answer all questions****[1 x 10 = 10M]**

1.
 - a) When an equation is said to be a dimensionally homogeneous equation?
 - b) Write the dimensions of specific speed of turbine.
 - c) What is the condition for most economical rectangular section of open channel?
 - d) Define critical flow.
 - e) Write an expression for force exerted by jet on stationary vertical plate?
 - f) What is the difference between impulse and reaction turbines?
 - g) What is the volumetric efficiency of a turbine?
 - h) Define manometric head of centrifugal pump?
 - i) What is meant by cavitation in centrifugal pump?
 - j) Write down the formulae of unit speed of turbine.

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

2.
 - a) State Raleigh's method of dimensional analysis? Mention its limitations. **[6M]**
 - b) Find an expression for time period of a pendulum T, which depends on length of string L, and acceleration due to gravity g. **[6M]**

(OR)

3.
 - a) State Buckingham's π theorem. **[4M]**
 - b) Show that the velocity through a circular orifice is given by

$$V = \sqrt{2gH} \phi \left[\frac{D}{H}, \frac{\mu}{\rho V H} \right] \quad \text{[8M]}$$

Where V is the velocity of flow through a circular orifice of diameter D under a head of H. ρ and μ are the density and viscosity of fluid.

Code: 13CE2007**UNIT-II**

4. a) Derive the expression for the condition of a most economical trapezoidal section of an open channel. [6M]
b) Find the longitudinal bed slope of a rectangular channel of bed width 6 m and depth of flow 2 m while the rate of flow is $20 \text{ m}^3/\text{s}$. Take Chezy's constant, $C=50$. [6M]

(OR)

5. a) Define sequent depths of hydraulic jump and derive the expression for head loss through hydraulic jump. [8M]
b) Write short note on classification of gradually varied flow profiles. [4M]

UNIT-III

6. a) Derive an expression for force exerted by jet on stationary curved plate? [6M]
b) A nozzle of 50 mm diameter delivers a stream of water at 20 m/s perpendicular to a plate that moves away from the jet at 5 m/s. in the same direction. Find the work done per second and efficiency of jet. [6M]

(OR)

7. a) Derive an expression for force exerted by a jet on moving plate? [6M]
b) A jet of water having a velocity of 40 m/s strikes a curved vane, which is moving with a velocity of 20 m/s. the jet makes an angle of 30° with the direction of motion of vane at inlet and leaves at an angle of 90° to the direction of motion of motion of vane at outlet. Draw the velocity triangles at inlet and outlet and determine the vane angles at inlet and outlet so that the water enters and leaves the vane without shock. [6M]

UNIT-IV

8. a) What are the functions served by a draft tube? [4M]
b) A Pelton wheel is to be designed for the following specifications. Shaft Power = 735.75 kW. Net Head = 200 m. Speed = 800 rpm. Overall efficiency = 86%. Coefficient of velocity = 0.98, Speed ratio = 0.45 and jet ratio should not be less than 10. Determine (i) Wheel diameter (ii) The number of jets required and (iii) Diameter of the jet [8M]

(OR)

9. a) Explain the functions of main parts and working principle of Francis turbine with a neat sketch. [6M]
b) A Francis turbine is required to produce 147.15 kW shaft power with an overall efficiency of 70% under a head of 8 m running at a speed of 200 rpm. Assuming a hydraulic efficiency 80%, speed ratio 0.3 and flow ratio 0.96 and radial discharge at outlet, determine (i) guide blade angle (ii) vane angle at inlet (iii) diameter and width of wheel at inlet. [6M]

Code: 13CE2007**UNIT-V**

10. a) Describe the working principle and main parts of centrifugal pump with neat sketch? [6M]
b) A centrifugal pump is to discharge $0.118 \text{ m}^3/\text{s}$ at a speed of 1450 rpm 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 outer periphery of the impeller. [6M]

(OR)

11. a) Write a short note on minimum starting speed of a centrifugal pump. [4M]
b) A three stage centrifugal pump has impellers 40 cm in diameter and 2 cm wide at outlet. The vanes are curved back at the outlet at 45° and reduce the circumferential area by 10%. The manometric efficiency is 90% and the overall efficiency is 80%. Determine the head generated by the pump when running at 1000 rpm and delivering 50 litres per second. What should be the shaft power? [8M]

3 of 3

Time: 3 Hours**Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) What is Deaeration?
- b) List any four advantages of hydro power?
- c) List the any four Nuclear power plants in India.
- d) List the types of gas turbine power plants.
- e) Classify the different distribution systems According to scheme of connections?
- f) What is the main purpose of a substation?
- g) Define utilization factor?
- h) Define block rate?
- i) What do you mean by underground cable and where is it used?
- j) What is gas insulated substation?

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

2. Explain the construction and working of Hydel power plant with a layout? 12M

(OR)

3. a) Explain the construction and working of any one High pressure boiler with a layout? 8M
- b) Describe different types of coal conveyors. 4M

UNIT-II

4. a) What are the advantages and disadvantages of wind power? 4M
- b) With a neat diagram, explain how wind energy can be converted into electrical energy. 8M

(OR)

5. a) What do you mean by fission of nuclear fuel? 4M
- b) Explain principle operation of PWR nuclear power plant with neat sketch 8M

UNIT-III

6. a) Comparison of DC and AC distribution systems. 6M
- b) Explain about the radial DC distributor? 6M

(OR)

7. Draw the single line diagram, show the location of substation equipment's for the following bus bar arrangements. i) Single bus bar and ii) Main and transfer bus bar. 12M

UNIT-IV

8. a) Draw the load curve for the power requirement in India and discuss the methods to fulfil the part load conditions. 8M
- b) How utilization factor affect the economy of power system? Explain briefly. 4M

(OR)

9. a) What is the objective of tariff? What type of tariff is employed for domestic consumers? 5M
- b) Why tariff is not employed for bulk consumers? Suggest and explain the tariff which encourages the consumers to keep load factor and power factor high. 7M

UNIT-V

10. a) Explain about the types of insulating materials? 6M
- b) What are the advantages and disadvantages of Underground cables? 6M

(OR)

11. Explain about the single line diagram of gas insulated substations with neat sketch? 12M

AR13

CODE: 13ME2009

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, April, 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 a Kinematic chain?
b) What are the types of kinematic pairs
c) What is pantograph?
d) What are the Conditions for correct steering
e) How to define an instantaneous centre
f) What is the use of Velocity and acceleration diagrams
g) What are the Types of followers
h) Describe concave and convex flanks
i) What is Law of gearing
j) Classify gear trains.

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Discuss in detail atleast two inversions of single slider crank chain mechanisms which give quick return motion.
b) Distinguish clearly between a 'structure' and a 'Machine'.

(OR)

3. a) Explain various inversions of single and double slider crank chains.
b) What is the difference between an element and a kinematic link of a machine. How do you classify links of a machine?

UNIT-II

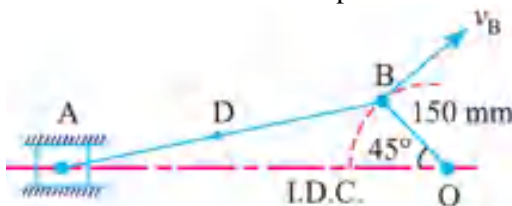
4. Two points P and Q, 4 cm apart are to be connected by a pantograph. The motion of P to the motion of P Q is 13 : 7. Find the distance of Q from the fixed point O of the pantograph such that the point P moves at least 12.7 cm in either direction of line O Q P when it is horizontal. Find also the main dimensions of the pantograph.

(OR)

5. a) Describe the working of Davis steering gear mechanism giving neat sketch. Derive the condition for correct steering of the above mechanism.
b) Sketch and Describe the Scott-Russel and Robert's straight-line motion mechanisms.

UNIT-III

6. 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 and acceleration of the midpoint of the connecting rod, and 2. angular velocity and angular acceleration of the connecting rod, at a crank angle of 45° from inner dead centre position.



(OR)

7. a) Discuss the three types of instantaneous centers for a mechanism.
b) What is coriolis component of acceleration? How is it determined?

UNIT-IV

8. a) Sketch the different types of cam followers.
b) Explain angle of Ascent, dwell and angle of descent.

(OR)

9. The following data relate to a circular cam operating a flat faced follower
Least diameter = 40 m.m.
Lift = 12 m.m.
Angle of action = 160°
Speed = 500 r.p.m.
If the period of acceleration of the follower is 60% of the retardation during the lift determine
(a) The main dimension of the cam (b) The acceleration of the main points
(c) What is the maximum acceleration and deceleration during the lift?

UNIT-V

10. a) Derive the formula for the length of the path of contact for two meshing spur gear having involute profile.
b) Find the length of the path of contact when pinion with 18 teeth meshes with an internally toothed wheel with 72 teeth, when the pressure angle is 20° , module pitch is 4 mm and the addenda of pinion and wheel are 8.7 mm and 3.7 mm respectively.

(OR)

11. In a reverted gear train, as show in Figure 11 two shafts A and B are in the same straight line and are geared together through an intermediate parallel shaft C. The gears connecting the shafts A and C have a module of 2 mm and those connecting the shafts C and B have a module of 4.5 mm. The speed of shaft A is to be about but greater than 12 times the speed of shaft B, and the ratio at each reduction is same. Find suitable number of teeth for gears. The number of teeth of each gear is to be a minimum but not less than 16. Also find the exact velocity ratio and the distance of shaft C from A and B.

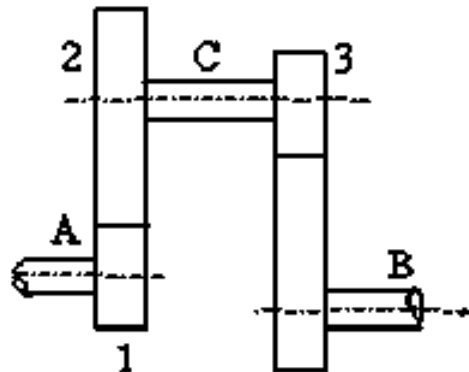


Figure-11

Time: 3 hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1x10=10 M]

1. a) What is a closed loop system?
b) What is the effect of negative feedback on overall gain of the system?
c) What are the applications of servo motors?
d) What is the range of damping ratio for a second order system to be unstable?
e) Define stability in any notion.
f) What is the necessary condition for existence of break away or break in point?
g) Define phase margin
h) Define gain cross over frequency?
i) What is the effect of bandwidth in lead compensator?
j) Write the expression for state transition matrix.

PART-B

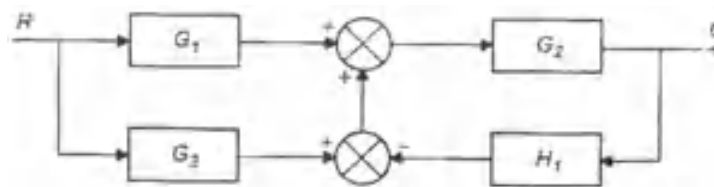
Answer one question from each unit

[5 x 12=60M]

UNIT-I

2. a) Obtain the transfer function $\frac{C(s)}{R(s)}$ for the block diagram shown in fig.(i) using reduction techniques.

[6M]



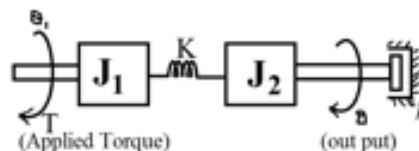
- b) Write the differences between open loop and closed loop systems

[6M]

(OR)

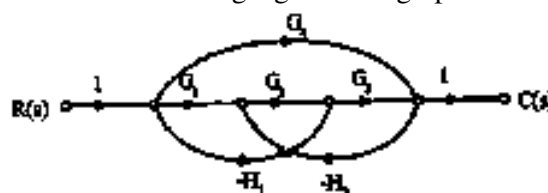
3. a) Obtain the transfer function for the following rotational system.

[6M]



- b) Determine the transfer function for the following signal flow graph.

[6M]



UNIT-II

4. a) Explain the characteristics of AC servo motor. [6M]
b) What are different standard test signals? Explain with necessary waveforms. [6M]

(OR)

5. a) Write a short note on static error constants. [6M]
b) Obtain the step response for the unity feedback system with open loop transfer function given by

$$G(s) = \frac{3}{s(s+4)}. \quad [6M]$$

UNIT-III

6. Explain the construction of root loci taking as an example the loop transfer function [12M]

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

(OR)

7. a) Apply RH criterion for the equation to determine the stability $s^4+5s^3+2s^2+3s+2=0$. Find the number of roots lying in the right half of the s-plane. [6M]
b) Discuss various difficulties in the formulation of Routh array and how they can be overcome? [6M]

UNIT-IV

8. Obtain the bode plot for the transfer function $G(s) = \frac{2}{(s+1)^2(s+16)}$. From the bode plot, obtain the phase margin and gain margin. [12M]

(OR)

9. Sketch the polar plot for the open loop system given as $G(s) = \frac{1+3s}{s(1+s)(1+2s)}$. [12M]

UNIT-V

10. a) Determine the state transition matrix for the system described by the following state model

$$\dot{X}(t) = \begin{bmatrix} 0 & 1 \\ -2 & -1 \end{bmatrix} X(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t) \quad [6M]$$

- b) Derive the expression for transfer function of a lead compensator. [6M]

(OR)

11. Diagonalize the system matrix given by $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix}$ [12M]

AR13

CODE: 13CS2010

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, April, 2018

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 meant by Critical Section?
b) Difference between Top down parser and Bottom up parser?
c) Definition of Monitors?
d) What is compilation process time?
e) Definition of parser tree with example?
f) Write about Aliasing with parameters?
g) What is Operator Overloading in C++?
h) Definition of Polymorphism?
i) Explain about Nested records?
j) What is meant by Race Condition?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Explain about History of Programming Languages? 6M
b) Explain in detail about Compilation and Interpretation Process? 6M

(OR)

3. a) Construct DFA and NFA for a regular expression in Scanning process? 6M
b) Discuss about Precedence and Associativity rules of expressions in grammar with examples? 6M

UNIT-II

4. a) Difference between Static Scoping and Dynamic Scoping with example program? 6M
b) Explain about Macro expansion in C Language? 6M

(OR)

- | | | |
|----|---|----|
| 5. | a) Summarize the concept of decorating a syntax tree with an example? | 6M |
| | b) What is meant by space management for attributes? | 6M |

UNIT-III

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|----|---|----|
| 6. | a) Explain in detail about Recursive and Iterative Fibonacci function with an example? | 6M |
| | b) Illustrate the concept of Selection and Iteration syntaxes of various programming languages with examples? | 6M |

(OR)

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|----|--|----|
| 7. | a) Explain about Records and Unions with examples? | 6M |
| | b) Discuss about basic List operations in LISP and ML? | 6M |

UNIT-IV

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|----|---|----|
| 8. | a) Define Exception Handling? Explain with an example program in C++? | 6M |
| | b) Explain in detail about Event Handling? | 6M |

(OR)

- | | | |
|----|--|----|
| 9. | a) Illustrate the concept of Producer and Consumer problem with example? | 6M |
| | b) Explain about Conditional Critical Regions (CRR)? | 6M |

UNIT-V

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|-----|--|----|
| 10. | a) Discuss about the concept of Inheritance in C++ with example? | 6M |
| | b) What is meant by Abstract classes and discuss various declarations in Java, C++ and C#? | 6M |

(OR)

- | | | |
|-----|--|-----|
| 11. | Explain about the following in PROLOG Language with examples? | 12M |
| | a) Facts and Rules b) Backtracking and Instantiation | |
| | c) Queries d) Resolution e) Lists f) Append function | |