

AR18

CODE: 18CET203

SET-2

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

II B.Tech I Semester Regular Examinations, October / November-2019

MECHANICS OF SOLIDS-I

(Civil Engineering)

Time: 3 Hours

Max Marks: 60

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) Develop the relationship between modulus of elasticity and modulus of rigidity 6M
- b) A steel rod 20m long is at a temperature of 30°C . Find the free expansion of the length when the temperature is raised to 90°C . Find the temperature stress produced when the expansion of the rod is prevented. Take thermal expansion is 12×10^{-6} And young's modulus is 200GN/m^2 6M

(OR)

2. a) A steel flat plate of trapezoidal form of uniform thickness 20mm tapers uniformly form a width 200mm to 400mm in a length of 1200mm. If the axial tensile force of 200kN is applied at each end, find the elongation of the plate. Take $E=205\text{GN/m}^2$ 6M
- b) Describe the procedure for finding out the stress in a composite bar 6M

UNIT-II

3. a) A 20m long girder carrying a uniformly distributed load of "w" kN/m is to be supported on two piers that are 12m apart in such a way that the maximum bending moment is as small as possible. Determine the distance of piers from the ends of the girder and the maximum bending moment. Draw the shear force and bending moment diagram 8M
- b) A cantilever has distributed load of linearly varying intensity with zero at the fixed end "w" per metre at the free end. Draw the shear force and bending moment diagram 4M

(OR)

4. a) A simply supported beam has a distributed load of linearly varying intensity with zero at each end to "w" per unit run at the mid span. Draw the shear force and bending moment diagrams 4M
- b) A simply supported beam of 7m span with overhangs rests on supports which are 4m apart. The left over hanging is 2m. the beam carries loads of 30kN and 20kN on the left and the right ends respectively apart from a uniformly distributed load of 25kN/m between the supporting points. Draw the shear force and bending moment diagrams. 8M

UNIT-III

5. a) Write the assumptions of theory of simple bending 4M
- b) A rectangular beam is to be cut out of a cylindrical log of wood with diameter "d". Determine the ratio of depth to width of the strongest beam which can be had from log of wood. 8M

(OR)

6. a) A simply supported I-beam of 2m span carries a central load of 4kN. The load acts through the centroid, the line of action is inclined at 30° to the vertical direction. Determine the maximum stress. 6M
- b) A simply supported cast-iron square beam of 800mm length and 15mm x 15 mm in section fails on applying a load of 360N at the mid span. Find the maximum uniformly distributed load that can be applied safely to a 40mm wide, 75mm deep and 1.6 m long cantilever made of the same material. 6M

UNIT-IV

7. a) A beam of square section is placed horizontally with one diagonal placed horizontally. If the shear force at a section of the beam is S, draw the shear stress distribution diagram for the section. 6M
- b) Draw shear stress distribution for I- section simply supported beam carried UDL? 6M

(OR)

8. a) A beam is triangular in section having a base b and an altitude h. It is placed with its base horizontal. If at a certain section of the beam the shear force is S, find the maximum shear stress and the shear stress at the neutral axis. 6M
- b) Determine the position of the shear centre for an 80 mm by 40 mm outside by 5 mm thick channel section 6M

UNIT-V

9. a) A hollow shaft of diameter ratio $3/8$ is to transmit 375kW at 100 rpm. The maximum torque being 20% greater than the mean; the shear stress is not to exceed 70 N/mm^2 and the twist in a length of 4 metre is not to exceed 2 degrees. Calculate the external and internal diameters which would satisfy both the above conditions. Take $G=8.5 \times 10^4 \text{ N/mm}^2$ 8M
- b) What is the difference between a closely coiled and open coiled helical springs 4M

(OR)

10. a) A solid shaft of 200 mm diameter has the same cross-sectional area as that of a hollow shaft of the same material with inside diameter of 150 mm. Find the ratio of the power transmitted by the two shafts at the same speed. 6M
- b) A closely coiled helical spring is to carry a load of 500N. It means coil diameter is to be 10 times that of the wire diameter. Calculate these diameters if the maximum shear stress in the material of the spring is to be 80 N/mm^2 6M

AR18

CODE: 18EET204

SET-2

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

II B.Tech I Semester Regular Examinations, October / November-2019

NETWORK ANALYSIS AND SYNTHESIS (Electrical and Electronics Engineering)

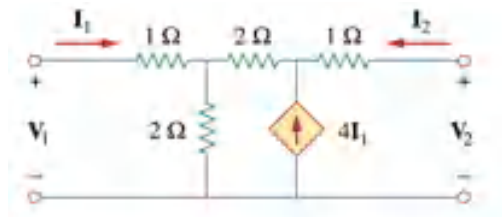
Time: 3 Hours

Max Marks: 60

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 h-parameters of the network shown in below figure. 6M



- b) Explain about Transmission parameters (ABCD). 6M
(OR)

2. a) Convert ABCD parameters to h parameters 6M
b) Two two-port networks are connected in series. Prove 6M
that the overall Z-parameters are the sum of
corresponding individual Z-parameters

UNIT-II

3. Find the transient response of RC Series Circuit using Laplace Transformation technique. 12M
(OR)
4. Find the transient response of RL Series Circuit for DC excitation. 12M

UNIT-III

5. Find the transient response of RL series circuit for sinusoidal excitation. 12M

(OR)

6. A series RLC circuit with $R=15\ \Omega$, $L=0.2\text{ H}$ & $C=3\mu\text{ F}$ has a sinusoidal voltage $v=400\cos(500t+\pi/4)\text{ V}$ applied at $t=0$. Determine the complete solution for the current. 12M

UNIT-IV

7. a) Determine the range of values of 'a' so that $P(S) = S^4 + S^3 + aS^2 + 2S + 3$ is Hurwitz. 6M

- b) Write short notes on Hurwitz polynomial. 6M

(OR)

8. a) What are the properties of positive real function? 6M

- b) Test whether $F(S) = \frac{S^3 + 6S^2 + 7S + 3}{S^2 + 2S + 1}$ is Positive Real function. 6M

UNIT-V

9. Realise the following function in Foster I & II forms. 12M

$$Z(S) = \frac{4(S^2 + 1)(S^2 + 3)}{S(S^2 + 2)}$$

(OR)

10. Find the cauer forms of the RL impedance function: 12M

$$Z(S) = \frac{2(S + 1)(S + 3)}{(S + 2)(S + 6)}$$

AR18

CODE: 18MET201

SET-2

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

II B.Tech I Semester Regular Examinations, October / November-2019

THERMODYNAMICS

(Mechanical Engineering)

Time: 3 Hours

Max Marks: 60

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) What are the sign conventions for work and heat transfer? 4M
- b) A gas expands from an initial state where the pressure is 340 kPa and the volume is 0.0425 m^3 final pressure is 136 kPa. The relationship between the pressure and volume of the gas is $PV^2 = \text{constant}$. Determine the work for the process. 8M

(OR)

2. a) Differentiate macroscopic and microscopic view points. 4M
- b) A mass of gas is compressed in a quasi-static process from 80 kPa, 0.1 m^3 to 0.4 MPa, 0.03 m^3 . Assuming that the pressure and volume are related by $PV^n = \text{constant}$, find the work done by the gas system. 8M

UNIT-II

3. a) Name the four processes that make up the Carnot cycle with flow chart. 4M
- b) A gas undergoes a thermodynamic cycle consisting of the following processes: 8M
 - (i) Process 1–2: Constant pressure $p = 1.4 \text{ bar}$, $V_1 = 0.028 \text{ m}^3$, $W_{12} = 10.5 \text{ kJ}$
 - (ii) Process 2–3: Compression with $PV = \text{constant}$, $U_3 = U_2$
 - (iii) Process 3–1: Constant volume, $U_1 - U_3 = -26.4 \text{ kJ}$.There are no significant changes in KE and PE.
 - (a) Sketch the cycle on a PV diagram.
 - (b) Calculate the net work for the cycle in kJ.
 - (c) Calculate the heat transfer for process 1–2.
 - (d) Show that cycle $\sum_{\text{Cycle}} Q = \sum_{\text{cycle}} W$

(OR)

4. a) State and explain the Clausius statement of second law of thermodynamics 4M
- b) Two kg of water at 90°C are mixed adiabatically with 3.5 kg of water at 20°C in a constant pressure of 1 atmosphere. Find the increase in the entropy of the total mass of water due to the mixing process (C_p of water = 4.187 kJ/kg K). 8M

UNIT-III

5. a) Draw P-V-T Surfaces and Explain 4M
b) Air flows steadily at the rate of 0.4 kg/s through an air compressor, 8M
entering at 6m/s with a pressure of 1 bar and a specific volume of $0.85\text{m}^3/\text{kg}$, and leaving at 4.5 m/s with a pressure of 6.9 bar and a specific volume of $0.16\text{m}^3/\text{kg}$. The internal energy of the air leaving is 88 kJ/kg greater than that of the air entering. Cooling water in a jacket surrounding the cylinder absorbs heat from the air at the rate of 59 W. Calculate the power required to drive the compressor and the inlet and outlet cross-sectional areas

(OR)

6. a) Write Helmholtz function and Gibbs function? 4M
b) An adiabatic vessel contains 3 kg of water at 27°C . By Paddle-wheel 8M
work transfer, the temperature of water is increased to 32°C . If C_p of water = 4.187 kJ/kg K , find the entropy change of the universe.

UNIT-IV

7. a) Define mass fraction, mole fraction and volume fraction of a Gas 6M
mixture.
b) Setup an expression for the partial pressure of a gas in the gaseous 6M
mixture in terms of mass and volume fraction.

(OR)

8. a) Show that $pV^\gamma = \text{RT}$ executing cyclic relation by an ideal gas. 8M
b) State and explain Dalton's law of partial pressure 4M

UNIT-V

9. In an air-standard Otto cycle, the compression ratio is 10. The 12M
condition at the beginning of the compression process is 100 kPa and 27°C . Heat added at constant volume is 1500 kJ/kg, while 700 kJ/kg of heat is rejected during the other constant volume process in the cycle. Specific gas constant for air = 0.287 kJ/kgK . Determine mean effective pressure of the cycle.

(OR)

10. a) Show that efficiency of Otto cycle depends on compression ratio. 4M
b) In an air standard Diesel cycle, the compression ratio is 15, and at the 8M
beginning of isentropic compression, the temperature is 15°C and the pressure is 0.15 MPa. Heat is added until the temperature at the end of the constant Pressure process is 1400°C . Calculate (i) the cut-off ratio and (ii) the cycle efficiency.

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AR18

CODE: 18EST202

SET-2

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

II B.Tech I Semester Regular Examinations, October / November-2019

**PROGRAMMING FOR PROBLEM SOLVING
(Electronics and Communication Engineering)**

Time: 3 Hours

Max Marks: 60

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 structure of the C Program. 6M
b) What is flow chart? Draw the flow chart for the biggest number among 3 numbers. 6M
(OR)
2. a) Explain about the precedence rules with examples. 6M
b) Write a C program that illustrates the conditional operator 6M

UNIT-II

3. a) Discuss about nested if with example. 6M
b) What is the need of looping or iterative and decision making control statements? 6M
Explain each of the statements with examples.
(OR)
4. a) Differentiate between break and exit. Give suitable examples. 6M
b) Write program to find whether the given no is Armstrong or not. 6M

UNIT-III

5. a) What is an array? How to initialize 1D and 2D arrays? Discuss about the advantages and disadvantages of arrays. 6M
b) Explain about the different types of functions with examples. 6M
(OR)
6. a) write a c program for matrix multiplication with sufficient conditions. 6M
b) Explain about user defined functions. How they are different from library functions? 6M

UNIT-IV

7. a) What is pointer? Explain about the declaration and initialization of pointer variables. 6M
b) Explain about pointers to pointers with example program. 6M
(OR)
8. a) Differentiate between direct and indirect pointers with examples. 6M
b) Write a program for illustrating the dynamic memory allocation. 6M

UNIT-V

9. a) What is the need of nested structures? Explain with one example. 6M
b) How structure elements are passed to function arguments? Discuss with an example 6M
(OR)
10. a) Is there any difference between structure and Union? If Yes, Explain. 6M
b) Explain about i) fseek() ii) ftell () iii) rewind () 6M

AR18

CODE: 18CST203

SET-1

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

II B.Tech I Semester Regular Examinations, October / November-2019

OBJECT ORIENTED PROGRAMMING

(Common to CSE & IT)

Time: 3 Hours

Max Marks: 60

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) Give advantages of object oriented programming over procedure oriented programming. 6M
- b) Explain the scope and life time of the variable. 6M

(OR)

2. a) List and describe any three string manipulation functions of Java String class. 6M
- b) What is Java Virtual Machine? Write brief notes about it. 6M

UNIT-II

3. a) Write about garbage collection in Java. 6M
- b) Differentiate between method overloading and method overriding. Demonstrate with examples. 6M

(OR)

4. a) Explain the use of 'this' keyword. 6M
- b) What is a nested class? Differentiate between static nested classes and non-static nested classes. 6M

UNIT-III

5. a) What is inheritance? What are the benefits of inheritance? Explain the various forms of inheritance with suitable code segments. 6M
- b) Write a runtime polymorphism program in Java by using interface reference variable. 6M

(OR)

6. a) Differentiate between class, interface and abstract class. 6M
- b) With a suitable program, describe the usage of 'super' keyword. 6M

UNIT-IV

7. By considering suitable examples, describe how packages provide access protection. 12M

(OR)

8. a) Describe the keywords that are essential in handling user-defined exceptions. 6M
- b) What is an exception? How are exceptions handled in Java programming? 6M

UNIT-V

9. a) What are the advantages of multithreading? 6M
- b) Describe producer-consumer pattern using inter-thread communication. 6M

(OR)

10. a) Demonstrate instanceof operator using a simple java program. 8M
- b) Deep describe life cycle of Applet with neat diagram. . 4M

AR16

CODE: 16CE2006

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October / November-2019

ENGINEERING GEOLOGY

(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) Explain in detail different methods of study of minerals and also discuss the relative advantages and disadvantages of these methods. 7M
- b) Write about the Physical properties of the following Economic minerals : 7M
i) Hematite ii) Bauxite

(OR)

2. a) How do you distinguish Olivine and quartz with the help of physical properties of minerals? 7M
- b) Define Rock and Mineral? Explain about the Mohr's Scale of Hardness with examples? 7M

UNIT-II

3. a) Explain about the importance of Petrology to the field of Civil Engineering?. 7M
- b) How are rocks classified? Give the main characteristics and geological classification of rocks. 7M

(OR)

4. a) Explain briefly about structure and forms of igneous rocks 7M
- b) Explain classification of sedimentary rocks giving suitable examples? 7M

UNIT-III

5. a) What are folds and how they are caused? Add note on the importance of folds in major civil engineering works, 7M
- b) Explain about Tension joints and compression joints. 7M

(OR)

6. a) Explain the advantages to study the branch of structural geology? Write and explain various faults with the help of neat sketches 7M
- b) Enumerate the unconformity its types, mechanism and their importance in civil engineering 7M

UNIT-IV

7. a) What is the purpose of Tunneling? Explain about the lining in Tunneling? 7M
- b) Explain the importance of the geological investigation of dams. Describe the various geological factors that may cause trouble during the construction of dam. 7M

(OR)

8. a) Explain the influence of geological structures, water table, and scope for preventive leakage for successful reservoir. 7M
- b) Explain with neat diagram favorable and unfavorable dips at a Tunnel site. 7M

UNIT-V

9. a) What are the advantages and uses of geophysical prospecting and explain gravity method of geophysical prospecting. 7M
- b) Comment on seismic exploration techniques for site investigation in civil Engineering projects and for water exploration. 7M

(OR)

10. a) What is the importance of geophysical methods? Explain the study of magnetic method in civil engineering prospecting 7M
- b) Discuss in details about resistivity survey method and applications of electrical resistivity method for ground water exploration 7M

Time: 3Hours

Max Marks: 70M

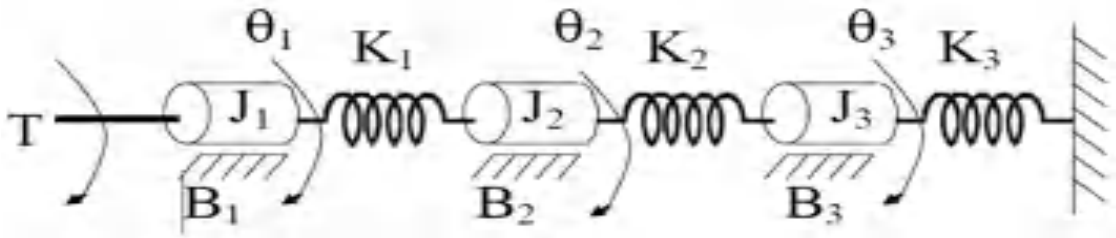
Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

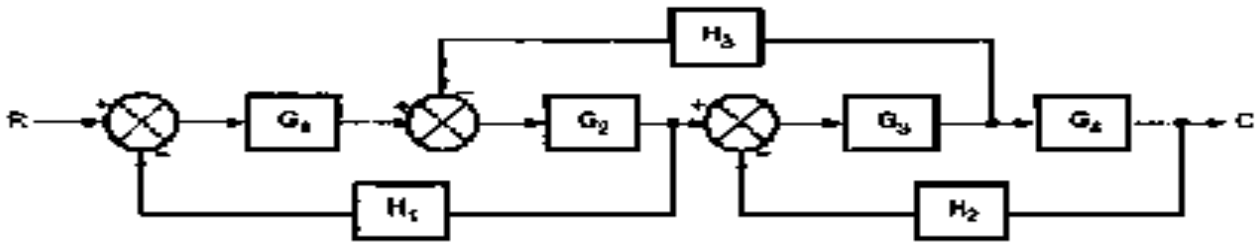
UNIT-I

- 1) Write the differential equations governing the given rotational mechanical system and find transfer function. 14M



(OR)

2. Find the Transfer function $C(s)/R(s)$ for the given system using block diagram reduction. 14M

**UNIT-II**

3. a). Derive the transfer function of DC armature control servo motor and draw the block diagram 9M
b) Briefly Explain the various standard test signals in time domain analysis. 5M
(OR)
4. For a unity feedback control system the open loop transfer function $G(S) = \frac{10(S+2)}{S^2(S+1)}$. Find
(i) Position, velocity and acceleration error constants.
(ii) The steady state error when the input is $R(S) = 3/S$ 14M

UNIT-III

5. a) State and Explain Routh-Hurwitz criterion and its difficulties with example. 8M
 b) Determine the stability of the following system by using Routh –Hurwitz criterion also comment on the poles location. 6M

$$s^7 + 5s^6 + 9s^5 + 9s^4 + 4s^3 + 20s^2 + 36s + 36 = 0$$

(OR)

6. The open loop transfer function of a unity feedback system is given by is
 $G(s) = k / \{S(S+1)(S+3)\}$ Sketch the root locus. 14M

UNIT-IV

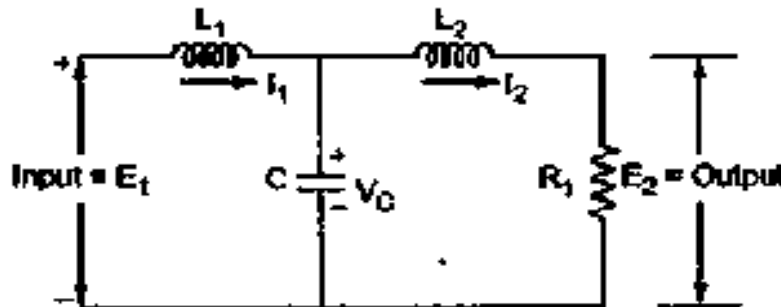
- 7 Draw the Bode plot for the transfer function $G(s) = 100 / \{S(1+0.1S)(1+0.5S)\}$. From graph Determine i) Gain cross over frequency ii) Phase cross over frequency iii) G.M and P.M iv) Stability of the system. 14M

(OR)

8. a) State and Explain Nyquist stability criterion in detail 6M
 b) Sketch the polar plot and comment on the stability of the closed loop system, Whose open loop transfer function is $G(s)H(s) = \frac{K(S-4)}{(S+1)^2}$ 8M

UNIT-V

9. a) Derive the expression for state transition matrix and write its properties . 6M
 b) Obtain the state model and draw the state diagram for the given simple electrical system 8M



(OR)

10. a) What is compensator, Derive the transfer function of lag compensator? 7M
 b) Determine state transition matrix.

$$\dot{X} = AX + BU, Y = CX. \text{ Where } A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}, B = \begin{bmatrix} 1 \\ 2 \end{bmatrix}, C = \begin{bmatrix} 1 & 1 \end{bmatrix}$$

7M

**** Ordinary graphs and Semi log Graphs have to be supplied**

AR16

CODE: 16ME2007

SET-1

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

II B.Tech I Semester Supplementary Examinations, October / November-2019

THERMODYNAMICS

(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 what you understand by thermodynamic equilibrium 7 M
- b Show that energy is a property of a system 7 M

(OR)

2. a What is a quasi -static process? What is its characteristic feature 7 M
- b An engine cylinder has a piston area 0.12 m^2 and contains a gas at a pressure of 1.5 MPa. The gas expands according to a process which is represented by a straight line on a pressure volume diagram. The final pressure is 0.15 MPa. Calculate the work done by the gas on the piston if the stroke is 0.30 m. 7 M

UNIT-II

3. a A blower handles 1 kg/s of air 20°C and consumes 15 kW. The inlet and outlet velocities of air are 100 m/s and 150 m/s respectively. Find the exit air temperature, assuming adiabatic conditions. Take c_p of air is 1.005 kJ/kg K 7 M
- b Establish Clausius inequality 7 M

(OR)

4. a A nozzle is a device for increasing the velocity of a steadily flowing stream. At inlet to a certain nozzle, the enthalpy of fluid passing is 3000 kJ/kg and velocity is 60 m/sec . At the discharge end, the enthalpy is 2762 kJ/kg . The nozzle is horizontal and there is negligible heat loss from it. Find the velocity at exit from nozzle. 7 M
- b A cyclic heat engine operates between a source temperature of 800°C and a sink temperature of 30°C . What is the least rate of heat rejection per kW net output of the engine? 7 M

UNIT-III

5. a What is available energy and unavailable energy? 5 M
b Steam initially at 1.5 MPa, 300°C expands reversibly and 9 M
adiabatically in a steam turbine to 40°C . Determine the ideal
work output of the turbine per kg of steam.

(OR)

6. a Write the Maxwell's equations 5 M
b Find the enthalpy and entropy of steam when the pressure is 2 9 M
Mpa and the specific volume is $0.09 \text{ m}^3/\text{kg}$.

UNIT-IV

7. a 0.5 kg of air is compressed reversibly and adiabatically from 9 M
 80 kPa , 60°C to 0.4 MPa , and is then expanded at constant
pressure to the original volume. Sketch these processes on the
P-V plane and compute work transfer for the whole path.

- b State and explain Dalton's law of partial pressure 5 M

(OR)

8. Two vessels, A and B, both containing Nitrogen, are 14 M
connected by a valve which is opened to allow the contents to
mix and achieve an equilibrium temperature of 27°C before
mixing the following information is known about the gases in
two vessels

Vessel A : $P = 1.5 \text{ MPa}$, $t = 50^{\circ}\text{C}$, contents = 0.5 kg mol ,

Vessel B : $P = 0.6 \text{ MPa}$, $t = 20^{\circ}\text{C}$, contents = 2.5 kg

Calculate the final equilibrium pressure, take $\gamma = 1.4$

UNIT-V

9. a Derive the expression for air standard efficiency of Otto 9 M
cycle with P-v and T-s diagrams

- b A diesel engine has a compression ratio of 14 and cut off 5 M
takes place at 6% of the stroke. Find air standard efficiency

(OR)

10. An air standard dual cycle has a compression ratio of 16, 14M
and compression begins at 1 bar , 50°C . The maximum
pressure is 70 bar . The heat transferred to air at constant
pressure is equal to that at constant volume. Estimate (i) the
pressure and temperatures at cardinal points of the cycle (ii)
the cycle efficiency, and (iii) the mean effective pressure of
the cycle

AR16

CODE: 16CS2004

SET-1

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

II B.Tech I Semester Supplementary Examinations, October / November-2019

**OBJECT ORIENTED PROGRAMMING
(Computer Science 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 procedural oriented programming and object oriented programming 8M
- b) What is Key Concepts of Object Oriented Programming language? Explain in detail 6M

(OR)

2. a) What is operator Precedence and Associativity? Explain with a suitable example 8M
- b) What are the disadvantages of Object Oriented Programming? 6M

UNIT-II

3. a) What are classes? Create a class with the following data members? Name of the class: Vehicle, Data members: name, model, company, Price, and variants, Member functions: putdetails() and getdetails() to set and display Vehicle details respectively? 8M
- b) What is access Specifier? List different Access Specifiers and outline their scope. 6M

(OR)

4. a) Explain Static Data Member and Static Member Function with suitable example. 7M
- b) Write down the rules for Operator overloading? 7M

UNIT-III

5. a) Define Inheritance? Explain about the multiple inheritances with example. 8M
- b) Write a Programme implementing hybrid Inheritance? 6M

(OR)

6. a) Discuss the role of inheritance in object oriented programming? 7M
- b) What is abstract class? Illustrate with suitable example? 7M

UNIT-IV

7. a) What is Virtual function? Explain it with a suitable example. 8M
- b) What is polymorphism? List and Explain different types of polymorphism. 6M

(OR)

8. a) What is Binding? Differentiate between static and Dynamic Binding. 7M
- b) What are various rules for virtual function? 7M

UNIT-V

9. a) What is Template? What is the need of Template? Declare a Template class. 8M
- b) What is necessity of Exception handling? Show how re-throwing of exception works. 6M

(OR)

10. a) What is generic programming? Explain in detail about function templates? 7M
- b) What is exception? Explain briefly about keywords used to handle exceptions? 7M

AR13

CODE: 13CE2003

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October / November-2019

ENGINEERING GEOLOGY

(Civil Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is the importance of geology in Civil Engineering?
- b) What is meant by Weathering of Rocks?
- c) Write any four types of typical forms of Minerals?
- d) What is meant by Strike and Dip directions?
- e) Write the classification of Resistivity Methods?
- f) What are the main & allied branches of geology?
- g) Define Erosion and Denudation.
- h) Define Streak.
- i) What is a Fold? Name the parts of fold?
- j) Write the applications of Seismic Refraction Methods.

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. What are the various branches of Geology and explain their relevance from Civil Engineering point of view. 12M
- (OR)
3. Briefly explain the Geological causes for the failure of St. Francis Dam, Halesbar Dam and hafayetha Dam. 12M

UNIT-II

4. Distinguish between 12M
 - (a) Granite and Dolerite.
 - (b) Sand stone and shale.
 - (c) Quartzite and Basalt.
 - (d) Marble and slate.

(OR)

5. Write detail an explanation about the various methods to study the minerals. 12M

UNIT-III

6. Describe the Classification of sedimentary rocks. 12M
(OR)
7. Explain the following: 12M
(a) Classification of metamorphic rocks.
(b) Explain the structures and textures of metamorphic rocks

UNIT-IV

8. Describe the different types of unconformities encountered in the nature. Draw neat sketches. 12M
(OR)
9. Write a note on the following: 12M
(a) Anticline and syncline (b) Similar and parallel folds
(c) Open and closed folds (d) Dome and Basin.

UNIT-V

10. What are types and applications of seismic refraction methods and explain? 12M
(OR)
11. Explain classification of geophysical methods. 12M

AR13

CODE: 13EE2004

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.TECH I SEM SUPPL. EXAMINATIONS, OCT/ NOVEMBER, 2019

ELECTRICAL CIRCUIT ANALYSIS-I
(Electrical & Electronics Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Define super mesh.
b) Define bandwidth.
c) Define Tree.
d) Write the expression for number of links on a graph.
e) State Superposition theorem.
f) State Reciprocity theorem.
g) What is the value of efficiency at maximum power transfer condition?
h) State Millman's theorem.
i) Define open circuit input impedance.
j) Write the condition for reciprocity in Y-parameters.

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. Derive the conversion formulae for Star to Delta and Delta to Star transformation. 12M

(OR)

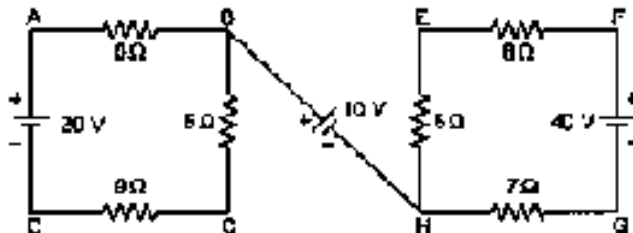
3. a) A series RLC circuit that will have an impedance of 10Ω at the resonant frequency of $\omega_0 = 50\text{rad/sec}$ and a quality factor of 80. Find the B.W and half power frequencies. 6M
- b) A parallel resonant circuit is composed of the elements $R=8K\Omega$, $L=50\text{mH}$ and $C=80\text{nF}$. Find (i) ω_0 (ii) Q_0 . 6M

UNIT-II

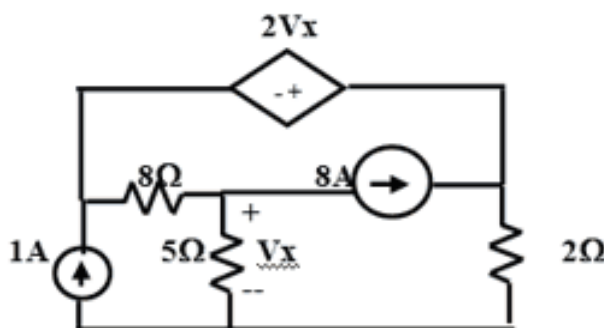
4. a) What is incidence matrix? Mention the properties of this matrix and explain reduced incidence matrix. 6M
- b) Explain the following terms i) Tree ii) Planar networks 6M

(OR)

5. a) Determine V_{CE} for the circuit shown below using loop analysis. 6M

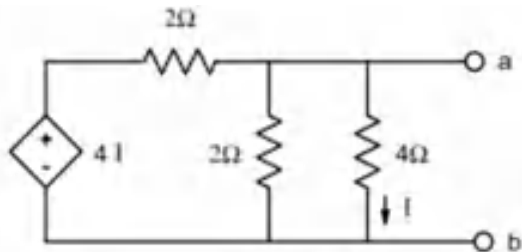


- b) Determine voltage V_x for the circuit shown below using nodal analysis 6M



UNIT-III

6. State and explain the super position theorem 12M
- (OR)
7. a) Obtain Norton's equivalent for the circuit shown below between the terminals a-b. 6M

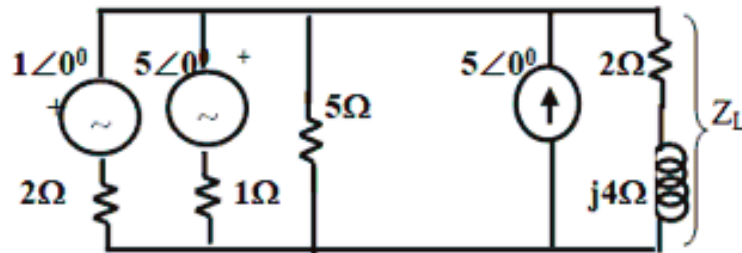


- b) State and explain reciprocity theorem with an example. 6M

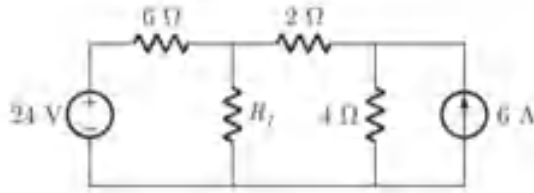
UNIT-IV

8. a) Derive the condition for maximum power transfer in dc circuits. 6M
 b) State and explain Compensation theorem with an example. 6M
 (OR)

9. a) Using Millman's theorem find current in load Z_L for the circuit shown below. 6M

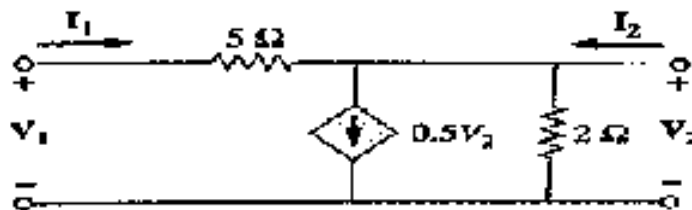


- b) Determine the value of R_L and also calculate P_{\max} by using maximum power transfer theorem. 6M



UNIT-V

10. a) Find Y-parameters for the circuit shown below. 6M



- b) Explain the Z and ABCD parameters 6M
 (OR)

11. a) Derive the condition for reciprocity in ABCD parameter representation. 6M
 b) Explain the concepts of reciprocity and symmetry. Derive the above conditions for h and ABCD parameters. 6M

AR13

CODE: 13ME2007

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October / November-2019

THERMODYNAMICS

(Mechanical Engineering)

Use of Steam, Ref & A/C Tables is permitted.

For Air Use $C_p=1.005$ kJ/kg K and $C_v=0.718$ kJ/kg K

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Distinguish between Microscopic and Macroscopic approach thermodynamics.
b) List any two thermodynamic extensive properties.
c) What are the causes of irreversibility?
d) State First law of thermodynamics applied to a closed system undergoing a cyclic process
e) Define PMM2.
f) Distinguish between real gas and Ideal gas?
g) A container is having a gas mixture of 4 kg of Oxygen and 7 kg of Nitrogen. What is the mole fraction of Oxygen in the mixture?
h) Define mean effective pressure.
i) Define relative humidity.
j) Compare the efficiency of Otto and Brayton cycles for the same compression ratio.

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Distinguish between reversible and irreversible process. 5M
b) An ideal gas undergoes expansion in a closed system reversibly according to the law $P=4/(3V^2)$ where p is in bar and volume changes from 0.1 m^3 to 0.3 m^3 . Determine the work done by the gas. 7M

(OR)

3. a) Distinguish between throttling and Rev. adiabatic expansion of an ideal gas. 5M
b) 5 kg of air is compressed reversibly and adiabatically from 1 bar, 27°C to 8 bar in a closed system. Determine the change in enthalpy and work required for compression. 7M

UNIT-II

4. a) Prove the equivalence of Kelvin Planck and Clausius statements. 5M
b) Steam enters a Turbine with a mass flow rate of 2 kg/s and with a velocity of 200 m/s and an enthalpy of 3200 kJ/kg. It leaves the Turbine at a velocity of 50 m/s and with an enthalpy of 2500 kJ/kg. While steam is flowing through the turbine there is a heat loss of 25 kJ/kg flow rate of steam to the surroundings. Neglecting changes in Potential energy determine the power developed by the Turbine. 7M

(OR)

5. a) Explain Carnot Cycle using p-V diagram and derive its efficiency. 5M
- b) Two reversible cyclic heat engines A and B are working in series such that the heat rejected by engine A is supplied to engine B through an intermediate reservoir. The source temperature of engine A is 1600°C and the sink temperature of engine B is 30°C . If the work done by the engine A is twice that of engine B determine the intermediate reservoir temperature. 7M

UNIT-III

6. a) Derive the fundamental four Maxwell's equations from first principles. 5M
- b) Determine the availability portion of 50000 kJ of heat energy drawn from a thermal reservoir at 1000°C . Draw the T-s diagram representing the Unavailable and available energy portions. Assume the surrounding temperature as 300K. 7M

(OR)

7. a) Develop the expressions to determine the enthalpy, entropy and specific volume of a pure substance in superheated state. 5M
- b) 2 kgs of dry saturated steam at 30 bar is iso-entropically expanded to 2 bar. Determine its final state, final specific volume and change in enthalpy. 7M

UNIT-IV

8. a) Explain the significance and limitations of Vander walls equation of state. 5M
- b) A perfectly insulated chamber is divided into two parts. One side of partition there is 3 Kg of air at 3 bar and 60°C and other side contains 10 kg of Air at 3 bar and 120°C . If the partition is removed and Air is allowed to mix what is the net change in entropy of Air. 7M

(OR)

9. a) Draw the adiabatic saturation process on Skelton psychrometric chart and explain it. 5M
- b) Find the specific enthalpy of Moist air at 760 mmHg pressure at a DBT of 50°C and relative humidity 60 %. 7M

UNIT-V

10. a) Derive the expression for efficiency of an Otto cycle. 5M
- b) 1 kg of Air at 1 bar and 27°C is compressed in an Otto cycle with a compression ratio of 8. The Maximum temperature in the cycle is 1000°C . Determine the mean effective pressure of the cycle.. 7M

(OR)

11. In an air-standard Otto cycle, the compression ratio is 10. The condition at the beginning of the compression process is 100 kPa and 27°C . Heat added at constant volume is 1500 kJ/kg, while 700 kJ/kg of heat is rejected during the other constant volume process in the cycle. Specific gas constant for air= 0.287 kJ/kgK. Determine mean effective pressure of the cycle. 12M

AR13

CODE: 13EE2007

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October / November-2019
NETWORK ANALYSIS

(Electronics and Communication Engineering)

Time: 3 Hours

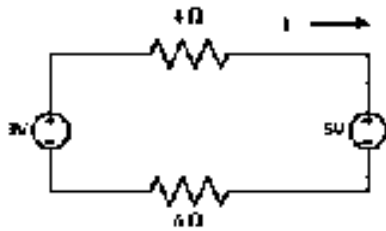
Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Find the current I in the circuit shown in below Fig.?



- b) Define ohm's law.
- c) Define frequency.
- d) Define tree of a network.
- e) Define the mutual inductance.
- f) Define Q factor for a series network.
- g) Define two port network.
- h) Why superposition theorem is not applicable for power responses?
- i) Define Time constant.
- j) Define low pass filter.

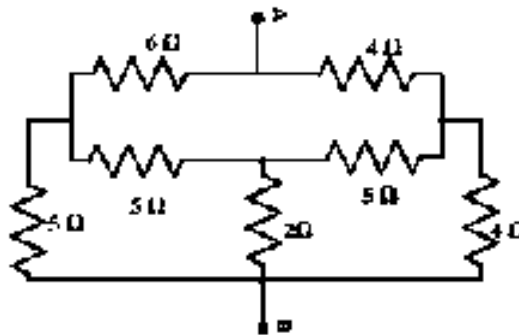
PART-B

Answer one question from each unit

[5x12=60M]

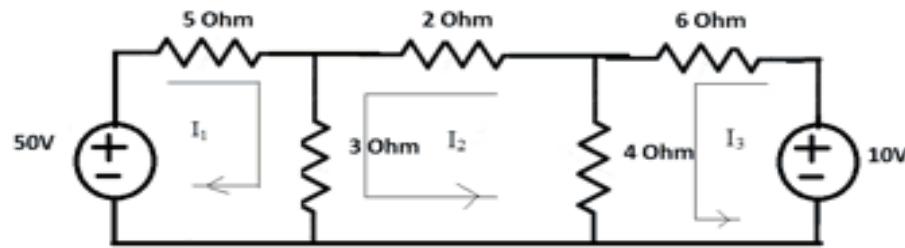
UNIT-I

2. Find the equivalent resistance between points A & B in the network shown in Fig. 12M



(OR)

3. Determine the power dissipation in the 4Ω resistor of the circuit shown in Fig. by using Mesh analysis. 12M

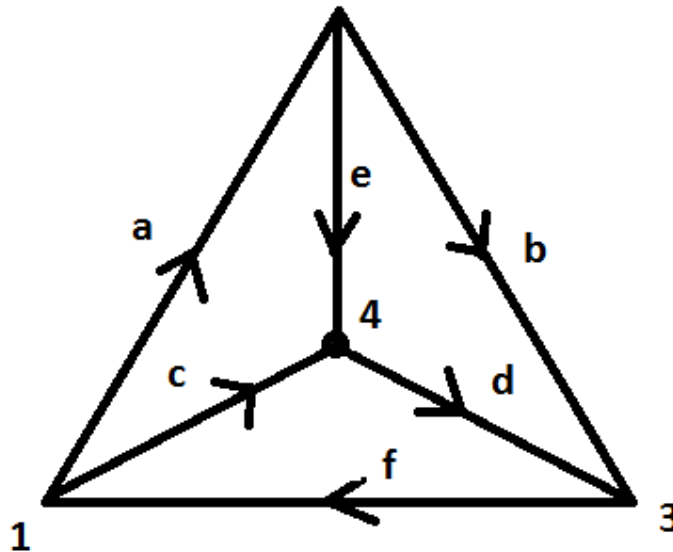


UNIT-II

4. Find the Form factor and peak factor of the Sinusoidal periodical current waveform? 12M

(OR)

5. (a) Define the following terms (i) Oriented graph (ii) Tree (iii) Basic Cut set (iv) Basic Tie set. 4M
(b) For the given graph shown in fig. draw the number of possible trees. 8M



UNIT-III

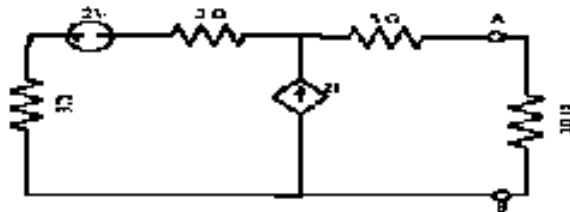
6. A 4Ω resistor is connected in series with a 100 mH inductor across a 100V, 50Hz voltage source, Find 12M
(i) Impedance of the circuit (ii) Input current
(iii) Drop across the resistor and inductance
(iv) Power factor of the circuit (v) Real power consumed in the circuit
(vi) Total power supplied.

(OR)

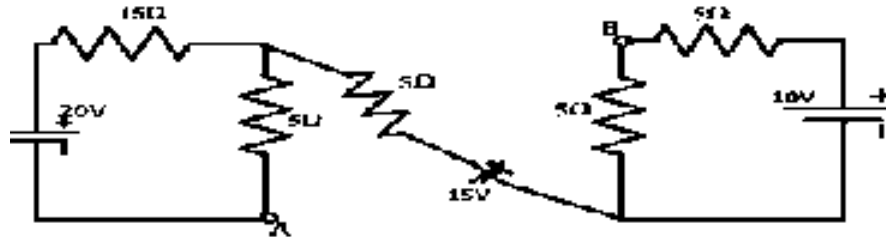
7. (a) Explain the relation between self-inductance and mutual inductance and coefficient of coupling in detail. 6M
(b) An iron ring has a mean circumferential length of 60 cm and a uniform winding of 300 turns. An air gap has been made by a saw cut across the section of the ring. When a current of 1A flows through the coil, the flux density in the air gap is found to be 0.126 mWb/m^2 . How long is the air gap? Assume iron has a relative permeability of 300. Also calculate the reluctance. 6M

UNIT-IV

8. (a) Find the Norton's equivalent across the terminals AB as shown in Fig., Hence find the current through 10Ω . 6M

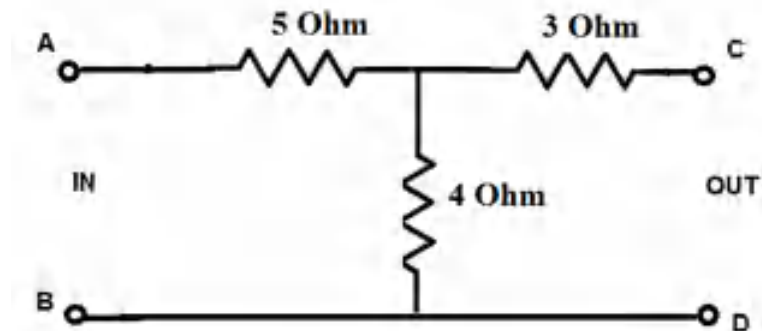


- (b) Determine the Thevenin's equivalent across the terminals A and B as shown in Fig.. 6M



(OR)

- 9 Obtain Z parameters of a network. 12M



UNIT-V

10. (a) For the circuit shown in Fig., Find the current in the 5Ω resistor when the switch is changed from 1 to 2 ? 6M

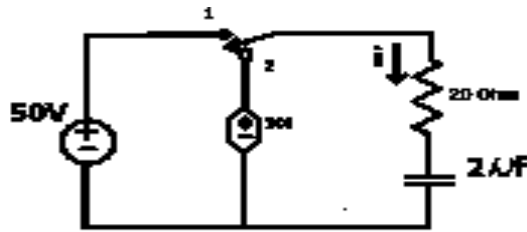


Fig. 15

- (b) In the Fig., find the expression for current at $t=0+$, following switching (opening of S). Assume steady state when S was closed. 6M



(OR)

- 11 Design a High pass filter having a cut-off frequency of 1 kHz with a load resistance of 600Ω and also draw T and π section. 12M

AR13

CODE: 13CS2004

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October / November-2019

ADVANCED DATA STRUCTURES
(Common to CSE and IT)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is meant by collision resolution?
b) What is a skip list?
c) Give some applications of Digital search trees.
d) What is 2-3-4 tree?
e) Define spanning tree.
f) Differentiate between min heap and max heap
g) What do you mean by Heap Order Property?
h) What is lazy binomial queue?
i) Define tries.
j) For an example graph, represent possible spanning trees

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Define dictionary. Give the applications of dictionary with 6 M
duplicates in which sequential access is desired.
b) Explain how open hashing and closed hashing is done with 6 M
examples.

(OR)

3. What is hashing? Write in detail about hashing. 12 M

UNIT-II

4. a) With suitable examples, describe the insertion and deletion 6 M
operations in a 2-3 tree.
b) Explain how AVL tree is different from the binary search 6 M
tree.

(OR)

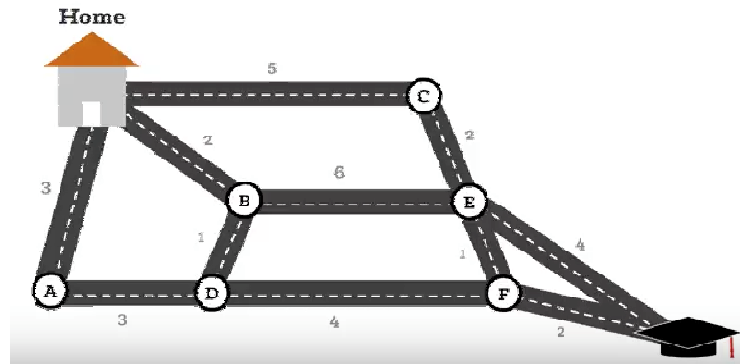
5. a) Describe Single rotation and double rotation while inserting 6 M
an element into an AVL tree.
b) Illustrate insertion and deletion operations in a Red-black 6 M
tree.

UNIT-III

6. a) What is a Minimum Cost Spanning tree? Explain Kruskal's Minimum cost spanning tree algorithm with suitable example. 6 M
- b) Consider an example graph and illustrate how to find solution to All Pairs Shortest Paths Problem using Floyd's Algorithm. 6 M

(OR)

7. a) Apply Dijkstra algorithm to find the shortest path between my home and my college by considering the following graph: 6 M



- b) Write and explain the steps of Warshall's algorithm. 6 M

UNIT-IV

8. a) Explain how binary heaps are implemented? Explain with an example. 6 M
- b) Construct a binary heap with the following data 150, 110, 90, 80, 70, 100, 180 6 M

(OR)

9. a) Discuss the applications of priority and binomial queues. 6 M
- b) What is a priority queue? Explain operations performed in priority queue. 6 M

UNIT-V

10. a) Explain about Patricia with examples. 6 M
- b) Which pattern matching algorithm avoids the repeated comparison of characters? Discuss with suitable example. 6 M

(OR)

11. a) Explain Knuth-Morris-Pratt algorithm with example. 6 M
- b) Discuss the advantages and disadvantages of tries with respect to binary search trees. 6 M