R16

II B.TECH I SEM

SUPPLEMENTARY EXAMINATIONS

APRIL 2024

Subject Code: R16CE2105

II B.Tech I Semester Supple Examinations, April-2024
FLUID MECHANICS
(CE)

Time: 3 hours   **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Define following terms with SI Units: i) Weight density ii) Dynamic Viscosity
   (b) State Pascal's law.
   (c) Define velocity potential function and stream function.
   (d) Define Impulse Momentum Equation.
   (e) Differentiate between orifice and mouthpiece.
   (f) Give the Darcy-Weisbach equation for friction loss and explain the terms.

   [2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Determine the specific gravity of a fluid having viscosity 0.05 poise and kinematic viscosity of 0.035 stokes. **[04]**
   (b) The surface tension of water in contact with air is given as 0.0725 N/m. The pressure outside the droplet of water of diameter 0.02 mm is atmospheric (10.32 N/cm^2). Calculate the pressure within the droplet of water. **[04]**
   (c) Derive the expression for capillary rise of water in a glass tube. **[04]**

3. (a) An inverted U-tube differential manometer is connected to two points of pipes A & B through which water is flowing. The vertical distance between the centres of these pipes is 30 cm with B below A. Oil (S = 0.8) is used in manometer. The level of manometer liquid in the two limbs is 35 cm above the centres of respective pipes. Determine the difference of pressure between the pipes. **[06]**
   (b) Derive an expression for the force exerted on a submerged vertical plane surface by the static liquid and locate the position of centre of pressure. **[06]**

4. (a) Write the expression for acceleration of a fluid in x, y and z directions. Differentiate between local and convective acceleration. **[06]**
   (b) If for a two- dimensional potential flow, the velocity potential is given by $\Phi=x(2y-1)$. Determine the velocity at the point p (4, 5). Determine also the value of stream function Ψ at the point P. **[06]**

5. (a) State Euler's equation of motion along a stream line and deduce Bernoulli's equation for the fluid flow. **[06]**
   (b) A hole is made at the bottom of the tank filled with water. If the total pressure at the bottom of the tank is three times of atmospheric pressure what is the velocity of the efflux? **[04]**
   (c) Differentiate between momentum equation and impulse momentum equation. **[02]**

6. (a) Define an orifice and a mouthpiece. What are hydraulic coefficients? **[04]**

(b) Water flows through a triangular right-angled weir first and then over a rectangular weir of 1.5 m width. The Cd values of triangular and rectangular weir are 0.65 and 0.70 respectively. If the depth of water over the triangular weir is 430 mm, find the depth of water over the rectangular weir. **[08]**

7. (a) The rate of flow of water through a horizontal pipe is 0.35 m^3/s. The diameter of the pipe which is 200 mm is suddenly enlarged to 450 mm. The intensity pressure in smaller pipe is 11.772 N/cm^2. Determine: (i) Loss of head due to sudden enlargement (ii) Pressure intensity in large pipe (iii) Power lost due to enlargement. **[06]**

(b) Define the term compound pipe and equivalent pipe. Derive the expression for diameter of equivalent pipes. **[06]**

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Subject Code: R16CE2106

II B.Tech I Semester Supple Examinations, April-2024
MECHANICS OF SOLIDS
(CE)

Time: 3 hours   **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Write about types of stresses?
   (b) Write about point of contraflexure?
   (c) State the assumptions of simple bending
   (d) Write the shear stress equations and explain the terms.
   (e) What is meant by composite shaft?
   (f) Write about compound cylinders?

                                                                    [2+2+2+2+2+2]

PART-B

                                                          4 X 12 = 48

2. (a) State Hooke's law and define Poisson's Ratio.   [4]
   (b) Determine the change in length, breath and thickness of steel bar 4m long, 30mm wide and   [8]
      20mm thick, when subjected to an axial pull of 120 KN in the direction of its length. Take
   E=200Gpa and Poisson's ratio = 0.3.

3. (a) Derive an expression for the strain energy stored in pure bending.   [5]
   (b) The normal stress at a point on two mutually perpendicular planes is 140 MPa (Tensile) and   [7]
      100 MPa (Compressive). Determine the shear stress on these planes if the maximum principal
   stress is limited to 150 MPa (Tensile).

4. (a) Draw the BMD for a cantilever carrying Uniformly Varying Load on the whole span.   [4]
   (b) A simply supported beam 6 m long is carrying a uniformly distributed load of 5 kN/m over   [8]
      a length of 3 m from the right end. Draw shear force and bending moment diagrams for the
      beam and also calculate the maximum bending moment on the beam.

5. (a) State the assumptions made in deriving bending equation.   [4]
   (b) A timber cantilever 200 mm wide and 300 mm deep is 3 m long. It is loaded with a U.D.L of   [8]
      3kN/m over the entire length. A point load of 2.7 kN is placed at the free end of the cantilever.
      Find the maximum bending stress produced.

6. (a) write the Limitations of Euler's theory in detailed.   [4]
   (b) Derive the equation for the Euler's crippling load for a column with both ends hinged.   [8]

7. (a) Explain about compound cylinders?   [4]
   (b) A cylindrical shell with internal diameter 60mm and having a thickness equal to 3 mm is made   [8]
      of mild steel. Determine the permissible internal fluid pressure if the factor of safety on maximum
      shear stress is 4.

Narasaraopeta Engineering College (Autonomous)

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Subject Code: R16EE2103

II B.Tech I Semester Supple Examinations, April-2024
ELECTRO MAGNETIC FIELDS
(EEE)

Time: 3 hours   **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) State Gauss's law for magnetostatic fields.
    (b) Define conduction and convection current densities.
    (c) Identify the relation between magnetic flux, magnetic flux density and MFI
    (d) State the properties vector magnetic potential
    (e) What does Lorentz force equation specify?
    (f) Prove Curl (H)=Jc

    [2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Derive an expression for electric field intensity at point P due to an electric dipole. Also find E at the same point.
   (b) Calculate the force on a unit positive charge at P (x=2m, y=0) due to the charges Q1 at origin and Q2 at (x=1m, y=0) where Q1=1000 Pico coulombs Q2= -2000 Pico coulombs

3. (a) State and prove the boundary conditions at the boundary between two dielectrics?
   (b) Derive Poisson's and Laplace's equations from the fundamentals.

4. (a) A filamentary current of 20A is directed in from infinity to the origin on the positive x axis, and then back out to infinity along the position y-axis. Use the Biot-Savarts law of find H at P (0, 0,1)
   (b) Explain the point form of Ampere's circuital law.

5. (a) Drive the expression for mutual inductance between a straight long wire and a square loop wire in the same plane.
   (b) Derive the expression for energy density in a magnetic field.

6. (a) Derive the expression for the force between two straight long and parallel current carrying Conductors in a magnetic field.
   (b) Write a note on Magnetic Dipole and Dipole Moment.

7. (a) Distinguish between statically induced e.m.f and dynamically e.m.f. Also explain their significance
   (b) Derive the Maxwell's equations in time varying fields.

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Subject Code: R16EE2105

II B.Tech I Semester Supple Examinations, April-2024
COMPLEX VARIABLES AND STATISTICAL METHODS
(EEE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) For what value of z, $f(z) = logz$ is not analytic?

(b) Define essential singularity.

(c) State Cauchy's residue theorem.

(d) If mean of a Poisson distribution is 8, then find its variance?

(e) State Central limit theorem.

(f) Define Type-I error.

$$[2+2+2+2+2+2]$$

PART-B

$$4 \text{ X } 12 = 48$$

2. (a) Determine the analytic function whose real part is $\dfrac{y}{x^2+y^2}$.

   (b) Determine p such that the function $f(z) = \dfrac{1}{2}\log_e (x^2 + y^2) + i \tan^{-1}\left(\dfrac{px}{y}\right)$ be an

   analytic function.

3. (a) Expand $f(z) = \dfrac{1}{(z-1)(z-2)}$ in the region $1 < |z| < 2$.

   (b) Evaluate $\displaystyle\oint_C \dfrac{e^z}{(z+1)^2}dz$, where C is $|z-1| = 3$ by using Cauchy's integral formula.

4. Determine the poles of $f(z) = \dfrac{2z+4}{(z+1)(z^2+1)}$ and the residues at each pole.

5. (a) In a Normal distribution, 7% of the items are under 35 and 89% of the items are under 63. Determine the mean and variance of distribution.

   (b) A random variable X has the following probability function:

$X = x$	0	1	2	3	4	5	6	7
$P(x)$	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

Find   (i)k (ii) Mean of X (iii) $P(X > 6)$.

6. (a) The mean of certain normal population is equal to standard error of the mean of the samples of 64 from that distribution. Find the probability that the mean of the sample size 36 will be negative.

(b) Explain briefly the following: (i) Point Estimation (ii) Interval Estimation.

7. (a) A sample of 64 students have a mean weight of 70kgs. Can this be regarded as a sample from a population with mean weight 56kgs and standard deviation 25kgs.

(b) The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of S.D. 2.5 inches. Use 5% L.O.S.

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NEC

Subject Code: R16ME2101

II B.Tech I Semester Supple Examinations, April-2024
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(ME)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Write the properties of active network elements?
(b) Define the excitation of DC machines?
(c) Write the differences between primary and secondary windings of the transformer?
(d) Write about the outcomes of AC generator operation?
(e) What is the function of rectifier?
(f) Draw the symbol and write briefly about the OP-AMP?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Draw the circuit diagram and explain the star-delta transformation with relevant equations?
(b) Compare the series and parallel networks of inductive and capacitive network elements?

3. (a) Describe the armature control method of speed control of DC shunt motor with circuit diagram?
(b) A 6 pole, 480V DC shunt motor has 740 wave connected conductors on its armature. The full load armature current is 57A and flux per pole is 0.036wb. Find the full load speed if the motor armature resistance is 0.4 ohms and the brush drop is 1.6V per brush?

4. (a) List out and explain the existence of various losses in a transformer?
(b) A 28kVA, single phase transformer has 448 turns in the primary and 34 turns in the secondary. The primary is connected to 2200V, 50Hz supply. Find the secondary voltage on open circuit, the current flowing through the two windings on full load and the maximum value of the flux?

5. (a) Derive and explain the torque- slip characteristics of three phase induction motor?
(b) A 3 phase 50Hz induction motor has a full load speed of 970 r.p.m. Find the slip, number of poles, frequency of the rotor induced e.m.f, speed of the rotor field with respect to the rotor structure, speed of the rotor field with respect to the stator structure and the speed of the rotor field with respect to the stator field?

6. (a) Compare the current flow in different types of transistors by using diagrams?
(b) Explain how the single stage CE amplifier will amplify the input signal?

7. (a) Draw the diagram and explain the non inverting mode of operation of OP-AMP?
(b) Derive the differentiator output of an OP-AMP application?

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Subject Code: R16ME2105

II B.Tech I Semester Supple Examinations, April-2024
THERMODYNAMICS
(ME)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Define an Isolated System? Give an Example?
   (b) What are the limitations of first law of Thermodynamics
   (c) Define quality of the liquid vapor mixture and write equation for determining enthalpy of the liquid vapor mixture.
   (d) What is a pure substance and give any two examples for it
   (e) Write down Maxwell's equations by using Helmholtz and Gibb's function.
   (f) What is a refrigerator? Write its COP expression

                                                                        [2+2+2+2+2+2]

PART-B

                                                                        4 X 12 = 48

2. (a) Define the following: i. Control volume   ii. Property
   (b) What is meant by displacement work? Explain the path dependence of displacement work with an example.

3. (a) Discuss the application of steady flow energy equation in any two most common engineering devices
   (b) A rigid tank contains a hot fluid that is cooled while being stirred by a paddle wheel. Initially, the internal energy of the fluid is 800 kJ. During the cooling process, the fluid loses 500 kJ of heat, and the paddle wheel does 100 kJ of work on the fluid. Determine the final internal energy of the fluid. Neglect the energy stored in the paddle wheel

4. (a) Explain in detail about the Kelvin – Plank statement of second law.
   (b) 1.2 m^3 of air is heated reversibly at constant pressure from 300 K to 600 K and is then cooled reversibly at constant volume back to initial temperature. If the initial pressure is 1 bar, calculate the net heat flow and overall change in entropy. Take Cp = 1.005 kJ/kgK and R = 0.287 kJ/kgK.

5. (a) Explain p-T (Pressure-Temperature) diagram for a pure Substance
   (b) Evaluate the condition of steam for the   i) Steam at 15bar pressure and specific volume is 0.12m^3/kg ii) Steam at 10bar pressure and 200°C temperature

6. (a) Derive Maxwell's equations
   (b) State the i) Daltons Law of partial pressure   ii) Define Real gas.

7. (a) What are the four processes that which constitute the sterling cycle? Show that the regenerative sterling cycle has the same efficiency as Carnot cycle.
   (b)Explain Vapour Compression Refrigeration system

Subject Code: R16EC2102

II B.Tech I Semester Supple Examinations, April-2024
ELECTRONIC DEVICES AND CIRCUITS
(ECE)

Time: 3 hours   **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Differentiate between intrinsic and extrinsic semiconductors.
   (b) Draw the energy band diagram of the PN junction diode.
   (c) List out the applications of the Zener diode.
   (d) Calculate the value of β if the transistor has $\alpha=0.98$.
   (e) Why BJT is called a current controlled device?
   (f) Compare JFET and MOSFET.

                                          [2+2+2+2+2+2]

PART-B

                                 4 X 12 = 48

2. (a) Write short notes on semiconductors.   [6]
   (b) Derive Einstein's relation in semiconductors.   [6]

3. (a) Discuss the switching characteristics of the PN junction diode with suitable diagrams.   [6]
   (b) Derive the expression for transition capacitance and diffusion capacitance of a PN diode. [6]

4. (a) Distinguish between avalanche and zener breakdown.   [6]
   (b) With the circuit and necessary waveforms explain the operation of a full wave rectifier.   [6]

5. (a) The reverse leakage current of a transistor when connected in CB configuration is 0.1 µA and
   it is 20 µA when the same transistor is connected in CE configuration calculate α, β.   [6]
   (b) Write down the comparison of CE, CC, and CB configurations with proper diagrams.   [6]

6. (a) Why biasing is important in BJT amplifier? Explain the concept of DC and AC load lines
   with a neat diagram.   [6]
   (b) How will you select the operating point, and explain it using CE amplifier characteristics? [6]

7. (a) Explain the construction and operation of p-channel JFET with neat diagrams.   [6]
   (b) Compare the operation of depletion and enhancement MOSFET with neat diagrams.   [6]

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Subject Code: R16EC2104

II B.Tech I Semester Supple Examinations, April-2024
CONTROL SYSTEMS
(ECE)

Time: 3 hours   **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Distinguish between open loop and closed loop system.

   (b) Find the steady state error of system $G(s) = \dfrac{15}{s(s+8)}$ for unit ramp input.

   (c) What are the features of PI controller?

   (d) What is the phase shift contributed by single pole at origin in transfer function.

   (e) Define Grain cross over frequency.

   (f) Draw the frequency response of lead compensator.

                                                                                 [2+2+2+2+2+2]

PART-B

                                                                                 4 X 12 = 48

2. Sketch the Bode plot and hence find Gain cross over frequency, phase cross over frequency, gain margin and phase margin for the function. (12 M)

$$G(s) = \frac{10(s+3)}{s(s+2)(s^2+4s+100)}$$

3. (a) Use the Routh stability criterion, determine the range of K for stability of unity feedback system whose open loop transfer function is (10 M)

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

   (b) State Routh stability criterion. (2 M)

4. Draw the signal flow graph and find the closed loop transfer function of a system whose block diagram is shown in Figure 1. (12 M)
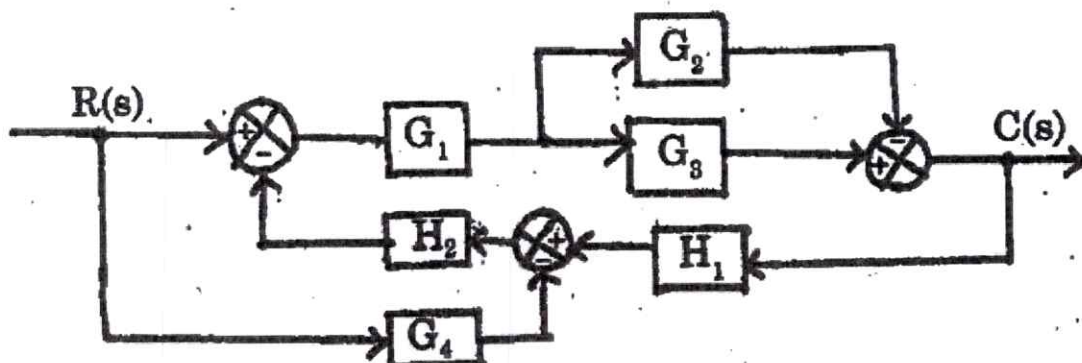

Figure 1.

5. Sketch the polar plot for the following transfer function and find Gain cross over frequency, phase cross over frequency, gain margin and phase margin for the function. (12 M)

$$G(s) = \frac{400}{s(s+2)(s+10)}$$

6. Drive the expression for frequency domain specifications. (12 M)

7. Find the transfer function $X_2(s)/F(s)$ from Figure 2. (12 M)
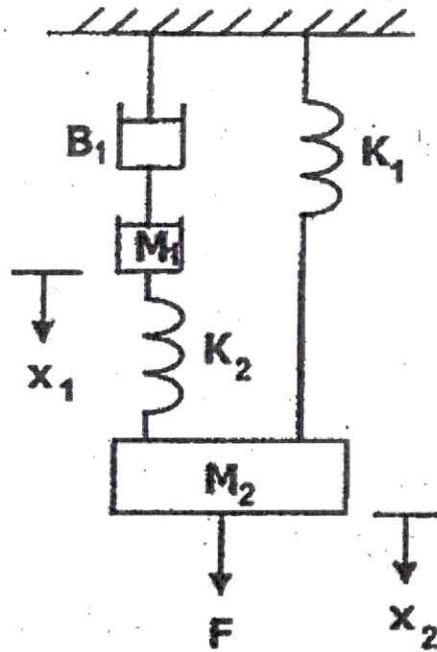

Figure 2

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Subject Code: R16EC2106
II B.Tech I Semester Supple Examinations, April-2024
ELECTRICAL AND MECHANICAL TECHNOLOGY
(ECE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) State the Fleming's left-hand rule?

    (b) Draw the slip-torque characteristics of three phase induction motor?

    (c) State the advantages and limitations of PMMC instruments.

    (d) What are the advantages of hot working over cold working of metals?

    (e) What is convection of heat? Give an example.

    (f) how does a flat belt differ from that of a V-belt.

                                                    [2+2+2+2+2+2]

PART-B

                                                    4 X 12 = 48

2. (a) Derive emf equation of D.C. generator from the first principles?

    (b) A single-phase transformer has 350 primary and 1050 secondary turns. The voltage per turn in the primary is 0.2 volts. Determine i) voltage induced in the primary and secondary windings ii) the maximum value of the flux density if cross section area of the core is 200cm^2 iii) KVA rating of the transformer if current in primary is 10A and frequency is 50Hz.

3. (a) What is voltage regulation? Explain the synchronous impedance method of determining regulation of an alternator.

    (b) A 4-pole, 3-phase induction motor operates from 440V, 3-phase, 50 HZ supply, and runs at a speed of 1440 r.p.m. What are the values of synchronous speed, slip speed and percentage slip.

4. (a) What are essential requirements in indicating instruments?

    (b) Explain the construction and working of MI instrument with the help of a neat sketch.

5. (a) explain the principle of resistance welding with neat sketches

    (b) Briefly explain the principle of rolling with a neat sketch.

6. (a) list and explain various modes of heat transfer with an examples

    (b) A longitudinal copper fin (k=3.5 W/m-K), 6 cm long and 5 mm in diameter is exposed to air stream at 20 °C. The connective heat transfer coefficient is 20 w/m^2-K. If the fin has the base temperature of 150 °C, calculate the heat transfer by the fin and fin efficiency.

7. (a) what is a gear? Explain various classification of gears with neat sketches.

    (b) Compare the merits and demerits of belts, rope and chain drives for power transmission.

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Narasaraopeta Engineering College (Autonomous)

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Subject Code: R16CS2102

II B.Tech I Semester Supple Examinations, April-2024
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(CSE)

Time: 3 hours   **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Explain converse, inverse and contra positive of conditional statement $A \to B$

(b) State types of quantifiers

(c) Explain product rule in elementary Combinatorics

(d) Find the first four terms of sequence $a_n = 2a_{n-1} + n \quad n \geq 2, a_1 = 1$

(e) Define partial order relation

(f) Define planar graph

$$[2+2+2+2+2+2]$$

PART-B

$$4 \text{ X } 12 = 48$$

2. (a) Show the following equivalencies without using truth tables

$$\neg(P \wedge Q) \to (\neg P \vee (\neg P \vee Q)) \Leftrightarrow (P \to Q)$$

(b) Express $P \to (\neg P \to Q)$ in terms of $\uparrow$ (NAND) only.

Express the same formula in terms of $\downarrow$ (NOR) only

3. (a) Show that $(\forall x)(p(x) \vee q(x)) \Rightarrow (\forall x)p(x) \vee (\exists x)q(x)$

(b) Show that $r \wedge (p \vee q)$ is a valid conclusion

from the premises $P \vee q, q \to r, p \to m$ and $\neg m$.

4. (a) Prove that in a lattice $(L, \leq)$, $a \leq b$ if and only if $a \wedge b = a$.

(b) If R is a Relation in the set of integers Z defined $R = \{(x, y) / x$ and y are integers and

$(x - y)$ is divisible by 6} then prove that R is an equivalence relation

5. (a) In every graph, show that i) the sum of degrees of all the vertices is twice the number of edges. ii) The number of vertices of odd degree is even

(b) Define planar and non-planar graphs. Draw the bipartite graph $k_{3,3}$ and find its chromatic number

6. (a) Find the numbers between 1 and 500 (both inclusive) which are divisible by 3 or 5 or 7. How many of them are divisible by 3 or 7 but not by 5.

(b) Show that $f(x,y) = x^y$ for $x, y \in N$ is primitive recursive

7. (a) Find the solution of $a_n - 4a_{n-1} - 12a_{n-2} = 0, \ n \geq 2, \ a_0 = 4; \ a_1 = \dfrac{16}{3}$ by the method of characteristic roots

(b) Solve using generating functions the recurrence relation

$a_n - 7a_{n-1} + 12 = 0$ for $n \geq 2, a_0 = 1, a_1 = 4$

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Subject Code: R16CS2104

II B.Tech I Semester Supple Examinations, April-2024
DATA STRUCTURES
(CSE)

Time: 3 hours   **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Define Time Complexity

b) Define heap.
c) List the application of stacks
d) List the advantages of circular linked list over single linked list
e) What is a binary search tree?
f) Define connected and bi-connected components.

$$[2+2+2+2+2+2]$$

PART-B

$$4 \ X \ 12 = 48$$

1. (a) Discuss different types of data structure their implementation applications
    b) Explain the recursion with example

2. Arrange the following list of elements in ascending order using heap sort: 9, 3, 5,
    27, 4, 67, 18, 31, 13, 20, 39, 21. Clearly show the sorting process at each step.

3. a) Explain the procedure to evaluate infix to postfix a+b*(c-d)+e*f-g
    b) Discuss briefly about the heap representation of priority queue.

4. A) Write an algorithm to insert new node at the beginning, at middle position and at the end
    of a singly linked list.
    b) Describe how a node can be deleted at a user specified position in a doubly linked list.

5. A) Write in-order, pre-order and post-order traversal of a binary tree.
    b) Write an algorithm for inserting in a binary search tree.

6. Explain Depth First Search and Breadth First Search algorithms in detail

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Narasaraopeta Engineering College (Autonomous)

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Subject Code: R16CS2105

II B.Tech I Semester Supple Examinations, April-2024
COMPUTER ORGANIZATION
(CSE)

Time: 3 hours   **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) What is Micro operation?
    (b) What is indirect address?
    (c) What are zero address instructions? Write one example
    (d) Define virtual memory
    (e) What is the need of I/O interface module
    (f) What Sign magnitude representation? Give an example?

                                                                          [2+2+2+2+2+2]

PART-B

                                                                          4 X 12 = 48

2. (a) Explain the block diagram of a computer with neat sketch
    (b) Discuss about the arithmetic logic shift unit with examples.

3. (a) Describe the memory reference instructions with an example
    (b) Discuss about stored program organization

4. Explain the addressing modes in detail

5. (a) Analyse the memory hierarchy in terms of speed, size and Cost
    (b) What is auxiliary memory? Explain the various memory components used as auxiliary
    memory in computer systems

6. (a) Explain the data transfer procedure for source initiated using handshaking
    (b) Explain the method of DMA transfer. How does a DMA controller improve the performance
    of a computer

7. Show the step by step multiplication process using Booth algorithm when the following binary
    numbers are multiplied (+15) * (-13). Assume 5-bit registers that hold signed numbers and draw
    the flow chart for the corresponding example

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Subject Code: R16CS2106

II B.Tech I Semester Supple Examinations, April-2024
FORMAL LANGUAGES AND AUTOMATA THEORY
(CSE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Write short notes on 5-tupple notation of finite automata.
   (b) Construct a CFG generating all integers with sign.
   (c) What is the difference between mealy and Moore machine?
   (d) Differentiate DFA and 2DFA?
   (e) Specify the reason for eliminating useless symbols? How to identify them?
   (f) What are the components of a Turing Machine?

   [2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Discuss the applications and limitations of Finite Automata?
   (b) Explain the procedure to test the equivalence of two finite state machines over set of strings 'S' with an example

3. (a) Describe the closure properties of context free grammars. How to simplify the context free grammars?
   (b) Find the language generated by context sensitive language G={V,T,P,S} where the production P={S->aSB|abc, bB->bbc, cB->Bc}

4. (a) Describe the formal notation for NFA with epsilon closure and the uses of ε-closure.
   (b) Design DFA which accepts language L={0,000,00000.......} over {0}.

5. (a) Convert the regular expression (((00)*(11)) + 01)* into an NFA.
   (b) Reduce the FA given below
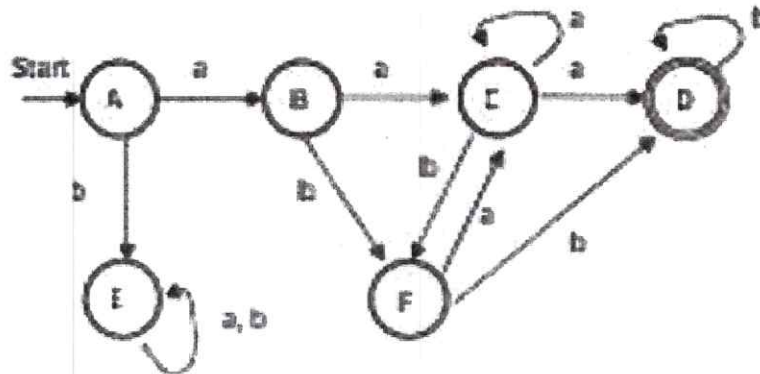
6. (a) Construct a pushdown automaton which accepts the language of words over the alphabet {a,b} containing more a's than b's.
   (b) Define Ambiguous Grammar? Check whether the grammar S→aAB, A→bC/cd, C→cd, B→c/d is Ambiguous or not?

7. (a) Design TM for the language $(a^n b^n c^n |n>=1)$
   (b) Explain about the Decidability and Undecidability Problems.

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