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Code No: R21051 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March - 2014
DATA STRUCTURES
(Com. to CSE, IT, ECC)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Analyze the linear search algorithm with an example.
   b) With an example, explain how you will measure the efficiency of an algorithm. (8M+7M)

2. Give an algorithm for quick sort and explain its time complexity. Trace the algorithm for the following data. 65 70 75 80 85 60 55 50 45 (15M)

3. a) Write an algorithm for converting infix expression to postfix expression.
   b) Explain the algorithm for evaluating postfix expression with suitable example (8M+7M)

4. Discuss any three types of special matrices with their implementation. Write pseudo code for adding two sparse matrices. (15M)

5. a) Give step wise procedure for in-order and post-order traversal of Binary Tree.
   b) Draw an expression tree for the given infix expression: (a/(b*c/d+e/f*g)) (10M+5M)

6. a) What is in order threaded binary tree? Write an algorithm for preorder traversal of a in order threaded binary tree
   b) Explain how Binary search tree is different from Binary tree? Construes a BST from the given list 9, 3, 5, 27, 4, 13, 20, 39, 46, 17 (7M+8M)

7. a) Explain the BFS technique in detail with an example.
   b) Describe various representation of graph. (7M+8M)

8. How will you represent sets using linked lists? Describe its operations using linked lists. (15M)
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Code No: R21051 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March - 2014
DATA STRUCTURES
(Com. to CSE, IT, ECC)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) What are the parameters on which an algorithm can be analyzed? Describe each with an example.
   b) Discuss the recursive algorithm for tower's of Hanoi problem. (8M+7M)

2. a) Explain how external sorting is different from internal sorting with an example?
   b) Explain merge sort with a suitable example. (7M+8M)

3. a) Write an algorithm for converting infix expression to postfix expression with an example.
   b) Write an algorithm to insert and delete a key in a circular queue. (8M+7M)

4. a) "Doubly linked list takes more space than singly linked list for storing one extra address". Under what conditions could be a doubly linked list be more beneficial than singly linked list.
   b) Create a circular linked list using dynamic memory allocation and show its advantages over linear linked list. (7M+8M)

5. a) What is a binary tree? Differentiate a binary tree from a binary search tree.
   b) Explain the process of displaying the nodes of a binary tree at a particular level. (7M+8M)

6. a) Explain the process of finding the minimum and maximum elements of the binary search tree.
   b) Construct a Binary Search Tree from the given values.
   45, 23, 29, 85, 92, 7, 11, 35, 49, 51 (8M+7M)

7. a) Explain the Kruskal's algorithm to find the minimum cost spanning tree with an example.
   b) What is a digraph? Define in- degree and out-degree with respect to a digraph. (10M+5M)

8. a) What are sets? Discuss their operations.
   b) Write ADT for array implementation of a queue. (5M+10M)
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Code No: R21051 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March - 2014
DATA STRUCTURES
(Com. to CSE, IT, ECC)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) State various asymptotic relations used for denoting time complexity.
   b) Define algorithm? What is the criterion that every algorithm must satisfy? (8M+7M)

2. Describe insertion sort algorithm and trace the steps of insertion sort for sorting the list- 12, 19, 33, 26, 29, 35, 22, 37. Find the total number of comparisons made. (15M)

3. a) Why is circular queue better than standard linear queue? Explain.
   b) Discuss the algorithms for push and pop operations on a stack (7M+8M)

4. Write an algorithm to insert new node at the beginning, at middle position and at the end of a Singly Linked List. (15M)

5. How do you represent binary tree in a list? Write an algorithm for finding K^{th} element and deleting an element. (15M)

6. What is a binary search tree? Write an algorithm for inserting and deleting a node in a binary search tree. (15M)

7. Write Dijkstra's algorithm to find the shortest path and explain. (15M)

8. Write ADT for array implementation of polynomial addition. (15M)
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Code No: R21051 **R10** SET - 4

II B. Tech I Semester Regular Examinations, March - 2014
DATA STRUCTURES
(Com. to CSE, IT, ECC)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Why recursive algorithms are inefficient? Analyze with the example of Fibonacci number.
   b) Explain time and space complexity related to algorithms and also state their importance (8M+7M)
2. Define heap. Explain heap sort with an example. (15M)

3. a) Convert the given Infix expression to Postfix expression using Stack and show the details of Stack at each step of conversion.
   Expression: (a + b * c ^ d) * (e + f / g). Note : ^ indicates exponent operator.
   b) Mention the advantages in the array implementation of lists. (10M+5M)

4. a) Write the algorithm for interchanging the elements of position P and next(P) in a singly linked list.
   b) What are the advantages and disadvantages of circular linked lists? (8M+7M)

5. Write algorithms to perform insert, delete operations on binary tree and explain them with an example each. (15M)

6. What is Binary Search Tree? Draw a binary search tree when following keys are inserted in order 5, 75, 19, 36, 8, 62, 49, 84, 12, 18, 25. How can a binary search tree be used for sorting of the keys? (15M)

7. Give the Prim's algorithm and explain its purpose with an example and analyze the algorithm. (15M)

8. a) What are bit strings? How information storage is done using bit strings.
   b) Give the applications of sets. (10M+5M)
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Code No: R21054 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March – 2014
DIGITAL LOGIC DESIGN
(Com. to CSE, IT)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Covert the following decimal numbers to binary, octal and hexadecimal numbers
   i) 196 ii) 207.05
   b) Perform the following subtraction using 2's complement
   i) 19 – 37 ii) 79 – 19
   c) Find out the BCD, excess -3 and Grey code for the decimal numbers 0 to 9. (5M+5M+5M)

2. a) Find the complements of the following expressions
   i) $(x\bar{y}+x\bar{z})(yz+y\bar{z})(xyz)$ ii) $x+\bar{y}\ z\ (x+y+\bar{z})$
   b) State and explain DeMorgan's theorems. Draw the logic equivalent circuits representing the theorems using basic gates.
   c) Determine the canonical sum-of-products representation of the following functions
   i) $f(a,b,c)=a+(\bar{c}+b)(c+\bar{b})$ ii) $f(a,b,c)=c+\left(\overline{\bar{c}\bar{b}+\bar{c}a}\right)$ (5M+5M+5M)

3. a) Simplify the Boolean expression using K-map
   $F(A,B,C,D)=\bar{A}+C+AB+A\bar{B}\bar{D}+AB\bar{D}$
   b) Reduce the expression $f(x,y,z,w)=\pi\ (0,2,7,8,9,10,11,15)+d(3,4)$ using K-map (7M+8M)

4. a) Realize a full-adder using i) only NAND gates and ii) only NOR gates
   b) With the help of a logic diagram explain a parallel adder/subtractor using 1's complement systems. (7M+8M)

5. a) Design an 8:1 multiplexer using NAND gates only
   b) Design the following code converters i) Binary to Excess-3 ii) Grey to Binary (7M+8M)

6. a) Explain the need and advantages of using programmable logic devices in digital system design
   b) Design a BCD to 7 segment decodes for common cathode display using a suitable PLA. (7M+8M)

7. a) Draw the schematic circuit of a clocked J-K Flip-Flop with active low preset and active low clear using NAND gates and explain its operation with the help of a truth table.
   b) Distinguish between combinational and sequential logic circuits. (8M+7M)

8. a) Design a 4 bit binary synchronous counter with D Flip-Flops.
   b) Design a 5 bit self-correcting ring counter (7M+8M)
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Code No: R21054 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March – 2014
DIGITAL LOGIC DESIGN
(Com. to CSE, IT)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Convert the following hexadecimal numbers to decimal binary, octal numbers
   i) $(357)_{16}$ ii) $(3AF.21)_{16}$
   b) Perform the following subtraction using 1's complements
   i) 28 – 78 ii) 96 – 22
   c) Generate a 4 bit Gray code directly using the mirror image property. (5M+5M+5M)

2. a) Simplify the following logic expressions using Boolean theorems.
   i) $(x+y+z)(x+\bar{y}+\bar{z}).(x+y+\bar{z}).(x+\bar{y}+z)$
   ii) $xyz+\bar{x}yz+x\bar{y}z+xy\bar{z}+x\bar{y}\ \bar{z}+\bar{x}y\bar{z}+\bar{x}\ \bar{y}\ \bar{z}.$
   b) Explain the terms
   i) Prime implicant ii) minterm and iii) maxterm
   c) Realize 2-input Ex-OR and Ex-NOR gates using (5M+5M+5M)
   i) NAND gates and ii) NOR gates only

3. a) Reduce the expression $f(x,y,z,w)=\sum(1,4,6,12,13,14)+d(2,5)$ using K-map.
   b) Simplify the Boolean expression using k-map $f(x,y,z,w)=(x+y)(x+\bar{y}+z)(x+\bar{z}).$
   (7M+8M)

4. a) Realize a full – sub tractor using i) only NAND gate and ii) only NOR gates.
   b) With the help of a basic diagram explain a parallel adder / sub tractor using 2's complement system. (7M+8M)

5. a) Design the following combinational logic circuits using a multiplexes
   i) Half – adder ii) Full – adder
   b) How does a priority encodes differ from an ordinary encodes explain with truth table and logic diagrams? (8M+7M)

6. a) Describe the differences between PLA and PAL.
   b) Derive PLA and PAL programming tables for a combinational circuit that squarer a 3 bit number. (7M+8M)

7. a) Explain the basic Flip-Flop circuit for R-S using i) NAND gates ii) NOR gates
   b) Explain how a T Flip-Flop is conversed in D Flip-Flop and J-K Flip-Flop. (8M+7M)

8. a) Design and implement a Mod – 6 synchronous counter using J-K Flip –Flop.
   b) Draw the logic diagram of a 4 bit shift resister. Explain how shift-left and shift-right operations are performed. (7M+8M)
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Code No: R21054 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March – 2014
DIGITAL LOGIC DESIGN
(Com. to CSE, IT)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Convert the following octal numbers to binary, decimal and hexadecimal numbers.
   i) $(175)_8$ ii) $(326.04)_8$
   b) Perform the following subtraction using 2'r complement.
   i) 38 – 21 ii) 19 – 92
   c) Explain even and odd parity codes. (5M+5M+5M)

2. a) Expend $A(\overline{A}+B)\,(\overline{A}+B-\overline{C})$ to max terms and min terms
   b) Simplify the following expressions.
   i) $A\overline{B}+ABC+A(B+A\overline{B})$ ii) $A+\overline{A}B+\overline{A}\overline{B}C+\overline{A}\overline{B}\overline{C}D.$
   c) Implement the Boolean function F (A, B, C, D) = $\overline{A}\overline{B}+\overline{C}\overline{D}+\overline{B}\overline{C}$ using the following two level gates (5M+5M+5M)
   i) NAND – AND ii) NOR – OR.

3. a) Reduce the expression $f(x, y, z, w)=\sum(0, 1, 4, 5, 6, 7, 9, 11, 14)+d(10, 15)$ using K - map.
   b) Reduce the Boolean expression using K – map (7M+8M)
   $f(x, y, z, w)=x\,\overline{y}\,z+y+y\,\overline{w}+x, y, \overline{w}+\overline{x}\,z.$

4. a) Realize a half – subtractor using i) only NOR gates and ii) only NAND gates.
   b) Explain a look – ahead – carry adder in detail. (8M+7M)

5. a) Implement the following expression using a single 8:1 multiplexer
   $F(x, y, z, w)=\sum(0, 1, 2, 5, 7, 8, 9, 14, 15).$
   b) Draw the basic diagram of a 2 to 4 decodes with an ENABLE input using (7M+8M)
   i) NAND gates ii) NOR gates.

6. a) Give the comparison between PROM, PLA and PAL.
   b) Design a combinational circuit that accepts a 3 bit number and generates an output binary number equal to the require of the input number using a ROM. (7M+8M)

7. a) Draw a neat circuit diagram of locked J – K flip – flop using NAND gates and give its truth table.
   b) Give the Excitation table for T flip- flop, SR flip-flop and J-K flip- flop. (7M+8M)

8. a) Design a 4 bit binary up / down ripple counter.
   b) Draw a neat circuit diagram of a 4 bit Johnson converter and draw the relevant output wave forms. (7M+8M)
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Code No: R21054 **R10** SET - 4

II B. Tech I Semester Regular Examinations, March – 2014
DIGITAL LOGIC DESIGN
(Com. to CSE, IT)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Convert the following binary numbers to decimal, octal number and Grey code.
   i) 110101101 ii) 10010001.
   b) Perform the flowing subtraction using 1's complement.
   i) 33 – 08 ii) 28 – 71
   c) What is BCD code? What are the rules for BCD additions? (5M+5M+5M)

2. a) Show that both NAND gate and NOR gate are universal gates.
   b) Explained $x + y\bar{z} + xy\bar{w} + xyzw$ to min.terms and max.terms.
   c) Simplify the following logic expressions using Boolean theorems. (5M+5M+5M)
   i) $AB + \overline{AC} + A\bar{B}C\ CAB + C)$ ii) $\bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + AB\bar{C}$.

3. a) Reduce the expression $f(x, y, z, w) = \sum(3, 5, 6, 7, 11, 13, 14, 15) + d\ (9, 10, 12)$.
   b) Reduce the following expression using K-map. (8M+7M)
   $f(x, y, z, w) = x(y + \bar{z})\ (x + \bar{y})\ (y + z + \bar{w})$.

4. a) Realize a half –adder using i) only NAND gates ii) only NOR gates.
   b) Give the implementation of a 4 bit ripple adder using full – adders. (8M+7M)

5. a) Design a 16:1 MUX using i) 3:1 MUX and or gate ii) 8:1 and 2:1 MUX.
   b) Implement the following function using 3 to 8 line decorous (7M+8M)
   i) $f(x, y, z) = \sum(0, 1, 5, 6)$ ii) $f(x, y, z) = \sum(0, 2, 3, 4, 6)$

6. a) Explain how to use PAL having only five product terms to realize a function having six product terms.
   b) Design a 3 bit Binary - to – Grey code converse using a suitable PLA. (8M+7M)

7. a) What is race – around condition? How does it set eliminated is a Master- slave J-K flip-flop.
   b) Convert a D flip – flop into SR flip-flop and T flip – flop. (8M+7M)

8. a) Design and implement a MOD-7 synchronous counter using T flip-flops.
   b) Design a 4 bit universal shift resister and draw the circuit with the given mode of operation table. (7M+8M)

S_1	S_0	Operation
0	0	Shift left
0	1	Shift right
1	0	Parallel
1	1	Inhibit clock
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Code No: R21026 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRONIC DEVICES AND CIRCUITS
(Com. to EEE, ECE, EIE, ECC, CSE, IT, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. Compare the motion and trajectories of electron when placed
   i) Only in electric field
   ii) Only in Magnetic field
   iii) Combined electric and magnetic fields. (15M)

2. a) What is Fermi-level? Prove that the Fermi level in an 'n'-type material is much closer to conduction band.
   b) Explain the concept of Hall Effect. (9M+6M)

3. a) Compare the characteristics of a P-N Junction diode, and Zener diode.
   b) Explain the formation of depletion region in an open-circuited PN-junction with neat sketches. (7M+8M)

4. a) Define the terms as referred to FWR circuit.
   i) PIV ii) Average DC voltage iii) RMS current iv) Ripple factor.
   b) In a full wave rectifier the required DC voltage is 10V and the diode drop is 0.5V. Calculate AC r.m.s input voltage required in case of bridge rectifier circuit and centre tapped full wave rectifier circuit. (8M+7M)

5. a) With neat diagram explain the various current components in a PNP transistor.
   b) Explain the input and output characteristics of a transistor in CB configuration. (8M+7M)

6. a) Describe the operation of UJT. Draw its equivalent circuit and hence define the Intrinsic Standoff ratio. Draw its characteristic curve and explain the various Parameters.
   b) Write a note on Silicon-Controlled Rectifier. (9M+6M)

7. a) Derive the condition to avoid the thermal runway.
   b) Draw the circuit diagram of a fixed bias and self bias circuits and derive the expressions for stability factors. (7M+8M)

8. a) Write a short note on Miller's theorem.
   b) Analyze a single stage transistor amplifier using h - parameters. (6M+9M)
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Code No: R21026 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRONIC DEVICES AND CIRCUITS
(Com. to EEE, ECE, EIE, ECC, CSE, IT, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) List out the advantages and disadvantages of both electrostatic and electromagnetic deflection systems
   b) Explain the terms:
   i) Potential ii) Electron Volt. iii) Charge density iv) Current density. (7M+8M)

2. a) What is Fermi-level? Prove that the Fermi level in a 'p'-type material is much closer to valency band.
   b) What do you mean by step graded junction? Derive the expression for diffusion capacitance. (8M+7M)

3. a) Explain the concept of tunneling with energy band diagrams.
   b) Explain the principle of operation of Varactor diode and photo diode. (7M+8M)

4. a) Define the following for a HWR:
   i) Ripple factor ii) PIV iii) TUF iv) Rectification efficiency
   b) Compare Full wave and Bridge rectifiers with respect to ripple factor, regulation, Rectification efficiency and PIV ratings. (8M+7M)

5. a) With neat diagram explain the various current components in a PNP transistor.
   b) Explain the input and output characteristics of a transistor in CE configuration. (8M+7M)

6. a) Define intrinsic standoff ratio and Draw the symbol and equivalent circuit of a UJT.
   b) Explain principle of the operation of UJT with the help of its V-I characteristics. (8M+7M)

7. a) Explain how self biasing can be done in a BJT, draw the equivalent circuit and find the stability factor for it.
   b) Explain the term "Thermal Runaway" and how to overcome it. (9M+6M)

8. With the help of exact and approximate hybrid model, derive expressions for current gain (A_I), input Impedance (Z_i), output impedance (Z_o) and voltage gain (A_V) of CE amplifier. (15M)
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Code No: R21026 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRONIC DEVICES AND CIRCUITS
(Com. to EEE, ECE, EIE, ECC, CSE, IT, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) List out the advantages and disadvantages of both electrostatic and electromagnetic deflection system?
   b) Explain the terms: (i) Potential (ii) Electron Volt (iii) Charge density (iv) Current density (7M+8M)
2. a) What is Fermi-level? Prove that the Fermi level in an 'n'-type material is much closer to conduction band
   b) Define Hall Effect, Diffusion and Continuity Equation. (9M+6M)

3. a) Explain the Zener diode characteristics in Reverse biased condition.
   b) Explain Zener diode as voltage regulator. (8M+7M)

4. a) Define the following terms of a rectifier and filter: i) Ripple Factor ii) Regulation iii) Rectification Efficiency iv) Form Factor v) Peak factor
   b) Explain full wave rectifier with capacitor filter with help of wave forms. (7M+8M)

5. a) With neat sketches explain the cut off region, active region and saturation region of CE output characteristics.
   b) The current gain of transistor in CE circuit is 49. Calculate CB current gain and find the base current where the emitter current is 3 mA. (8M+7M)

6. a) Explain MOSFET V-I characteristics in Enhancement and depletion mode.
   b) What are the advantages JFET over BJT? (8M+7M)

7. a) Define stability factors S, S' and S''' and determine stability factor for collector to base bias
   b) Explain the term "Thermal Runaway" and suggest methods to overcome it. (9M+6M)

8. With the help of exact and approximate hybrid model. Derive the expressions for current gain, input Impedance, output impedance and voltage gain of a CB amplifier. (15 M)
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Code No: R21026 **R10** SET - 4

II B. Tech I Semester Regular Examinations, March – 2014
ELECTRONIC DEVICES AND CIRCUITS
(Com. to EEE, ECE, EIE, ECC, CSE, IT, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. Compare the motion and trajectories of electron when placed (15M)
   i) Only in electric field ii) Only in Magnetic field iii) Combined electric and magnetic fields.

2. a) What is Fermi-level? Prove that the Fermi level in an 'p'-type material is much Closed to conduction band
   b) Explain the concept of tunneling with energy band diagrams. (9M+6M)

3. a) Explain how a variable capacitance can be built using a Varactor diode.
   b) Explain the principle and operation of photo diode with help of neat diagram. Also draw the V-I characteristics. (7M+8M)

4. a) Derive the expression for ripple factor, regulation, rectification efficiency for half wave rectifier.
   b) Define the terms as referred to FWR circuit: i) PIV ii) Average DC voltage iii) RMS current iv) Ripple factor. (7M+8M)

5. a) With neat diagram explain the various current components in an NPN transistor.
   b) Explain the input and output characteristics of a transistor in CB configuration. (8M+7M)

6. a) Describe the operation of UJT. Draw its equivalent circuit and hence define the intrinsic standoff ratio. Draw its characteristic curve and explain the various Parameters.
   b) Explain principle of operation of SCR using its V-I characteristics. (8M+7M)

7. a) Derive the expressions for stability factors in the case of self bias of a CE mode transistor.
   b) Explain biasing compensation techniques. (8M+7M)

8. a) Write a short note on Miller's theorem.
   b) Analyze a single stage transistor amplifier using h - parameters. (7M+9M)
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Code No: R21022 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March – 2014
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Com. to EEE, ME, ECE, EIE, CSE, IT, ECC, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Explain the exceptions to the law of demand.
   b) Discuss various determinants of demand for electronic gadgets. (8M+7M)

2. a) Explain how to forecast demand for new products.
   b) Explain point and arc elasticity of demand. (8M+7M)

3. a) Explain law of variable proportions.
   b) Discuss briefly managerial significance of break even analysis. (8M+7M)

4. Explain Price-Output determination in Perfect Competition. (15M)

5. What is business cycle? What are the various phases of business cycles? (15M)
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6. From the following Trial Balance, prepare a Trading, Manufacturing and Profit and Loss Account and balance sheet as on 31st December 2012: (15M)

TRIAL BALANCE as on 31st December 2012

Particulars	Amount Rs.	Amount Rs.
Stock on 1.1.2012		
Raw materials	20,000/-	
Work-in progress	50,000/-	
Finished Goods	100,000/-	
Manufacturing wages	100,000/-	
Purchasing of Raw materials	300,000/-	
Factory Rent	50,000/-	
Carriage of Raw materials	30,000/-	
Salary of the Works Managers	20,000/-	
Office Rent	20,000/-	
Printing and Stationery	10,000/-	
Bad Debts	10,000/-	
Sales		600,000/-
Land and Buildings	300,000/-	
Plant and machinery	200,000/-	
Depreciation on Plant	20,000/-	
Sundry Debtors	50,000/-	
Sundry Creditors		300,000/-
Cash in Hand	50,000/-	
Capital		430,000/-
Total		**13,30,000**
	13,30,000/-	

7. From the following particulars, prepare the Funds Flow Statement: (15M)

Liabilities	1 JAN Rs.	31 Dec Rs.	Assets	1 Jan Rs.	31 Dec Rs.
Creditors	36,000	41,000	Cash	4,000	3,600
Bank Loan	30,000	45,000	Debtors	35,000	38,400
Capital	1,48,000	1,49,000	Stock	25,000	22,000
			Land	20,000	30,000
			Building	50,000	55,000
			Machinery	80,000	86,000
	2,14,000	**2,35,000**		**2,14,000**	**2,35,000**

8. a) Discuss the need for Capital Budgeting.
   b) Explain i) ARR ii) NPV (7M+8M)

Code No: R21022 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March – 2014
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Com. to EEE, ME, ECE, EIE, CSE, IT, ECC, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Explain the basic economic tools in Managerial Economics.
   b) What is Law of Demand? (8M+7M)

2. Explain: a) survey Method of demand forecasting b) Trend Projection Method
   c) Delphi method (5M+5M+5M)

3. a) Explain Least cost Combination of Inputs.
   b) Distinguish between Explicit costs and implicit costs. (8M+7M)

4. a) Explain the features of Monopolistic Competition.
   b) What is Peak Load Pricing and Transaction based Pricing? (8M+7M)

5. Discuss characteristic features of Industrial organization and also business cycles. (15 M)

6. From the following balance extracted from the books of RKC Co. pass the necessary closing entries, prepare a trading and Profit and Loss account and Balance Sheet. (15 M)

Particulars	Rs.	Particulars	Rs.
Opening Stock	1,250	Plant and machinery	6,230
Sales	11,800	Returns Outwards	1,380
Depreciation	667	cash in hand	895
Commission(cr.)	211	Salaries	750
Insurance	380	Debtors	1,905
Carriage Inwards	300	Discount (Dr.)	328
Furniture	670	Bills receivable	2,730
Printing Charges	481	Wages	1,589
Carriage Outwards	200	Returns Inward	1,659
Capital	9,228	bank Overdraft	4,000
Creditors	1,780	Purchases	8,679
Bills Payable	541	Petty cash in Hand	47
		Bad Debts	180

The value of stock on 31st December 2012 was Rs.3,700
~~~~~~~~~~~~~~~~~~~~~~~~~~

7. From the following Balance sheets as on 31st December 2011 and 31 December 2012 , prepare a Schedule of Changes in the Working capital and a funds flow statement taking:
   i) the provision for tax and proposed dividends as non-current liabilities.
   ii) the provision for tax and proposed dividends as current liabilities. (15 M)

Balance sheet as on 31 December

Liabilities	2011 Rs.	2012 Rs.	Assets	2011 Rs.	2012 Rs.
Share capital	10,000	15,000	Fixed Assets	10,000	20,000
Profit & Loss account	4,000	6,000	Current assets	13,000	14,500
Provision for Tax	2,000	3,000			
Proposed Dividends	1,000	1,500			
Sundry Creditors	4,000	6,000			
Outstanding Expenses	2,000	3,000			
	23,000	**34,500**		**23,000**	**34,500**

Additional Information
Tax paid during 2011 Rs.2,500
Dividends paid during 2011 Rs.1,000

8. A Project initial investment is 10 lakhs and cash inflows for five years are as follows.

Year	**Cash inflows**
2008	2,00,000
2009	2,40,000
2010	3,00,000
2011	3,60,000
2012	4,00,000

The cost of Capital is 12%. Compute NPV and IRR of the Project. (15 M)

Code No: R21022 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March – 2014
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Com. to EEE, ME, ECE, EIE, CSE, IT, ECC, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. Discuss the multidisciplinary nature of Managerial economics. Explain the scope of managerial economics. (15 M)

2. Explain types of income elasticity of demand with suitable examples. (15 M)

3. Discuss the Cobb Douglas Production function. What is opportunity cost? (15 M)

4. What is kinked Demand Curve? Explain price output determination in oligopolistic market. (15 M)

5. Outline the features of Sole Proprietorship. (15 M)

6. From the following balances, taken from the Trial Balance of SCo Ltd. Prepare a trading and Profit and Loss account for the year ending 31st December 2012 (15 M)

Particulars	Dr. Rs	Cr. Rs.
Stock on1.1.2011	2,000	
Purchases and sales	20,000	30,000
Returns	2,000	1,000
Carriage	1,000	
Cartage	1,000	
Rent	1,000	
Interest received		2,000
Salaries	2,000	
General Expenses	1,000	
Discount		500
Insurance	500	

The closing stock on 31st December 2011 is Rs.5, 000.
~~~~~~~~~~~~~~~~~~~~~~~~~~

7. From the following Profit and Loss account, you are required to compute cash from operations (15 M)

Profit and Loss account for the ending 31 December 2010

Particulars	Rs	Particulars	Rs
To Salaries	5,000	By Gross Profit	25,000
To Rent	1,000	By Profit on sale of Land	5,000
To Depreciation	2,000	By income tax refund	3,000
To loss on sale of Plant	1,000		
To Goodwill written off	4,000		
To Proposed Dividends	5,000		
To Provisions for Taxation	5,000		
To Net Profit	10,000		
	33,000		**33,000**

8. Explain Net Present value and payback methods of capital budgeting. (15 M)

Code No: R21022 **R10** SET - 4

II B. Tech I Semester Regular Examinations, March – 2014
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Com. to EEE, ME, ECE, EIE, CSE, IT, ECC, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~~~

1. Explain discounting principle, incremental concept and equi-marginal concept. (15 M)

2. Discuss various forecasting demand for new products with suitable examples. (15 M)

3. Discuss the production function with all inputs variables. (15 M)

4. Explain Skimming Price policy, Marginal cost pricing and Limit Pricing. (15 M)

5. Discuss the various phases of business cycles. Explain its features. (15 M)

6. Enter the following transactions in proper subsidiary books of Ram; (15 M)

2010		
January 1	Sold goods to Ramesh	5250
January1	Bought from hari ram	7800
January2	Ramesh returned oods	750
January2	Sold to Dev	5500
January2	Purchased goods from Mangal	7000
January4	return goods to Mangal	1000
January4	Bought from Devi dayal	3250
January4	Sold to Zakeer	3500
January5	zakeer returned goods	450
January6	Sold to ram saran	5000
January6	sold to Gyan	3000
January7	ram saran returned goods	500
January7	Bought from Devi dayal	7000
January8	Return goods to Devi dayal	750
January9	Purchased goods from raghuSubject	
	To trade discount of 10%	10,000
January10	Sold to rajaram goods subject to	
	Trade discount of 5%	5,000
~~~~~~~~~~~~~~~~~~~~~~~~~~

7. From the following ratios draw the balance sheet of the company for the year 2012 (15 M)

Current Ratio	2.5
Liquidity Ratio	1.5
Net Working Capital	Rs.3,00,000
Stock Turnover Ratio (Cost of Sales/closing stock)	6 times
Gross Profit Ratio	20 per cent
Fixed assets Turnover ratio(on cost of sales)	2 times
Debt Collection Period	2 months
Fixed assets to shareholders net worth	0.80
Reserve and Surplus to Capital	0.50

8. Initial Investment for a project is 20 lakh. The Project life is 6 years and the cash inflows for six is as given below

Year	Cash inflow Rs.
1	3,50,000
2	4,00,000
3	5,00,000
4	5,50,000
5	6,00,000
6	5,00,000

The cost of capital of is 13%. Compute NPV, IRR and Payback period. (15 M)

Code No: R21053 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March – 2014
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE AND ENGINEERING
(Com. to CSE, IT, ECC)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~

1. a) Prove that $(\exists x)P(x) \wedge Q(x) \Rightarrow (\exists x)P(x) \wedge (\exists x)Q(x)$. Does the converse hold?
   b) Obtain the principal conjunctive normal form of the formula
   $(\neg P \rightarrow R) \wedge (Q \leftrightarrow P)$. (8M+7M)

2. a) If a=1820 and b=231, find GCD (a, b). Express GCD as a linear combination of a and b.
   b) Find 11^7 mod 13 using modular arithmetic.
   c) Use mathematical induction to prove that 5 divides n^2-n whenever n is non-negative integer. (5M+5M+5M)

3. a) Let A be a given finite set and ρ(A) its power set. Let $\subseteq$ be the inclusion relation on the elements of ρ(A). Draw Hasse diagrams of $<\rho(A), \subseteq>$ for A={a}; A={a,b}; A={a,b,c} and A={a,b.c.d}.
   b) Let F_x be the set of all one-to-one onto mappings from X onto X, where X={1,2,3}. Find all the elements of F_x and find the inverse of each element. (8M+7M)

4. a) Apply BFS algorithm to find a spanning tree for the following graph in Figure 4a.

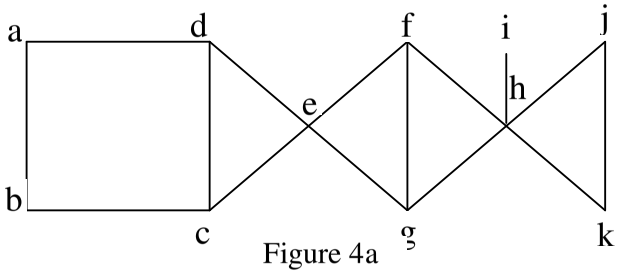

Figure 4a

   b) Determine whether the graphs in Figure 4b, are isomorphic. (8M+7M)

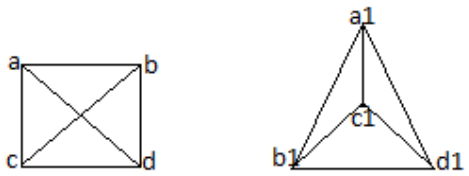

Fig: 4b

|''||||'|''||''|''|
~~~~~~~~~~~~~~~~~~~~~~

5. a) Verify Euler's formula for Figure 5.

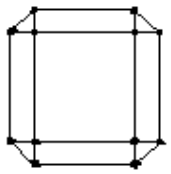

Fig: 5

b) Draw the bipartite graph $K_{3,3}$ and find its chromatic number. (5M+10M)

6. a) If <G,∗> is an abelian group, then for all a,b ∈ G show that $(a*b)^n = a^n * b^n$

b) We are given the ring <{a,b,c,d}, +, > whose operations are given by the following table:

+	a	b	c	d
a	a	b	C	d
b	b	c	D	a
c	c	d	A	b
d	d	a	B	c

.	A	b	C	D
A	A	a	A	A
B	a	c	A	C
C	a	a	A	A
D	a	c	A	A

Is it a commutative ring? Does it have an identity? What is the zero of this ring? Find the additive inverse of each of its elements. (5M+10M)

7. a) In how many ways five students can be selected from 12 students:
   i) Without replacement.
   ii) If two students not be included.
   iii) A particular student to be included.

   b) Find the sum of all 4-digit numbers that can be obtained by using digits 2, 3, 5 and 7 (without repetition). (8M+7M)

8. a) Solve the recurrence relation $u_{n+3} + 5u_{n+2} - 18u_n = 0$. Given that

$$u_0 = 4, u_1 = -\frac{1}{6}, u_2 = 4.$$

b) Solve the recurrence relation $u_n = u_{n-1} + \frac{n(n+1)}{2}, n \geq 1.$ (8M+7M)

Code No: R21053 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March – 2014
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE AND ENGINEERING
(Com. to CSE, IT, ECC)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Show that from
   i) $(\exists x)(F(x) \wedge S(x)) \rightarrow (y)(M(y) \rightarrow W(y))$
   ii) $(\exists y)(M(y) \wedge \neg W(y))$ the conclusion $(x)(F(x) \rightarrow \neg S(x))$ follows.
   b) Obtain the principal disjunctive and conjunctive normal forms of $(P \rightarrow (Q \wedge R)) \wedge (\neg P \rightarrow (\neg Q \wedge \neg R))$. Is this formula a tautology? (7M+8M)

2. a) Find the integers x such that
   i) $5x \equiv 4 \pmod 3$ ii) $7x \equiv 6 \pmod 5$ iii) $9x \equiv 8 \pmod 7$
   b) Determine GCD (1970, 1066) using Euclidean algorithm. (8M+7M)

3. a) If $f:A \rightarrow B$ and $g:B \rightarrow C$ are bijections, prove that $gof:A \rightarrow C$ is a bijection.
   b) Given the relation matrices M_R and M_S, find $M_{R \circ S}$, $M_{\tilde{R}}$, $M_{\tilde{S}}$, $M_{R \tilde{\circ} S}$ and show that $M_{R \tilde{\circ} S} = M_{\tilde{S} \circ \tilde{R}}$

$$M_R = \begin{pmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{pmatrix} \quad M_S = \begin{pmatrix} 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \end{pmatrix}$$ (7M+8M)

4. a) Find the depth first search spanning tree for the following graph in Figure 1.
   b) Prove that in a graph G, $\delta(G) \leq \frac{2|E|}{|V|} \leq \Delta(G)$. (10M+5M)

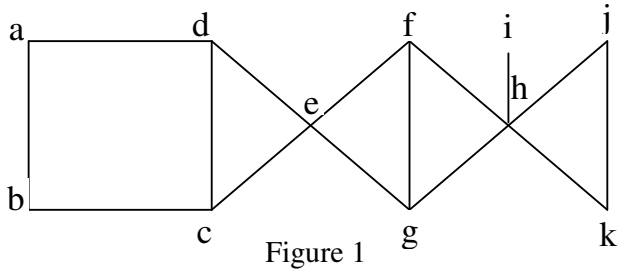

Figure 1
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5. a) Prove that a Star graph S_5 is isomorphic to bipartite graph $K_{1,4}$. Also Draw the graphs S_5 and $K_{1,4}$.
   b) Prove whether K_4 and K_5 are planar or non-planar. (7M+8M)

6. a) Find all the subgroups of S_4 generated by the permutation
$$\begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 3 & 2 & 4 \end{pmatrix} and \begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 3 & 4 & 2 \end{pmatrix}$$
   b) Let A=(6,12,18,24,36,72), a≤b if and only if a divides b. Draw Hasse diagram for it and prove that it is a lattice, but not a distributive lattice. (7M+8M)

7. a) How many six character passwords in a computer are possible, if the first two characters are the letters and the others are digits?
   b) Define Multinomial theorem. Find number of integers <250 and divisible by 3 or 5 or 11. (7M+8M)

8. a) Find the generating function of the sequence 0, 1, 2^2, 3^2, 4^2, …
   b) Solve the recurrence relation $u_n + 5u_{n-1} + 6u_{n-2} = 3n^2-2n+1$. (7M+8M)

Code No: R21053 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March – 2014
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE AND ENGINEERING
(Com. to CSE, IT, ECC)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~~

1. a) Using normal forms, show that the formula $Q \vee (P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$ is a tautology.
   b) Show that $(x)(P(x) \vee Q(x)) \Rightarrow (x)P(x) \vee (\exists x)Q(x)$ (5M+10M)

2. a) Let a, b ∈ Z so that 2a+3b is a multiple of 17. Prove that 17 divides 9a+5b.
   b) Use Euler's theorem to find a number *a* between 0 and 9 such that *a* is congruent to 7^{1000} modulo 10.
   c) If n is a positive integer, using mathematical induction prove that
   $$1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 + ... + n(n+1) = \frac{n(n+1)(n+2)}{3}$$ (5M+5M+5M)

3. a) If A={1,2,3,4} and P={{1,2},{3},{4}} is a partition of A, find the equivalence relation determined by P.
   b) Let X={1,2,3} and f, g, h and s be functions from X to X given by f={<1,2>, <2,3>, <3,1>} g={<1,2>, <2,1>, <3,3>} h={<1,1>, <2,2>, <3,1>} and s={<1,1>, <2,2>, <3,3>}. Find fog, fohog, gos, fos.
   c) Let X={1,2,3,4} and R={<1,1>, <1,4>, <4,1>, <4,4>, <2,2>, <2,3>, <3,2>, <3,3>}. Write the matrix of R and sketch its graph. (5M+5M+5M)

4. a) Apply Krushal's algorithm to determine a minimal spanning tree for the weighted graph given below in Figure 4.

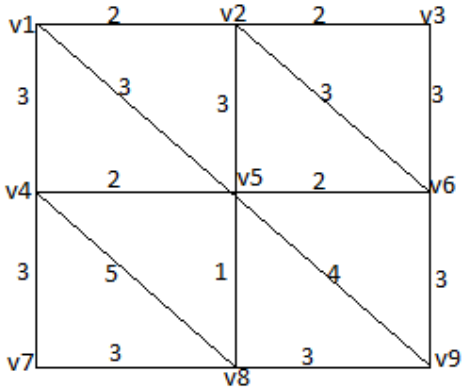

Fig: 4

   b) Consider a full binary tree of n vertices and k levels. Give the formulae for total number of vertices, total number of edges, total number of leaves and total number of internal vertices. Draw a full binary tree of level 3 and verify the above formulae. (7M+8M)
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5. a) Find the Chromatic polynomial of the graph of Figure 5.

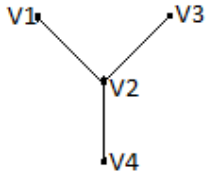

Fig. 5

b) Show that the maximum number of edges in a complete bipartite graph with n vertices is $n^2/4$.

c) Find the Hamiltonian circuit for Figure 6. (5M+5M+5M)

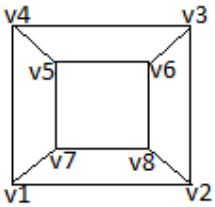

Fig: 6

6. a) Show that in a group <G, *>, if for any a,b ∈ G, $(a*b)^2 = a^2 * b^2$, then <G,*> must be abelian.

b) Prove that (S≤) is a lattice, where S= (1, 2, 3, 6) and ≤ is for divisibility. Prove that this is a distributive lattice. (7M+8M)

7. a) In how many different orders can three men and three women be seated in a row of six seats if:

i) Any one may sit in any one of the seats.

ii) The first and last must be filled by men.

iii) Men and women are seated alternate.

iv) All members of same sex be seated in adjacent seats.

b) Find the number of integers < 500 and divisible by 9 or 11 or 13. (8M+7M)

8. a) Solve the recurrence relation $a_n = a_{n-1} + a_{n-2}$ = where $n \geq 2$, $a_0 = 1$, $a_1 = 1$ using generating function.

b) Determine the sequence generated by $\frac{1}{1-x} + 3x^7 - 11$. (10M+5M)

Code No: R21053 **R10** SET - 4

II B. Tech I Semester Regular Examinations, March – 2014
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE AND ENGINEERING
(Com. to CSE, IT, ECC)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~~

1. a) Show that
   $\neg(P\wedge Q)\rightarrow(\neg P\vee(\neg P\vee Q))\Leftrightarrow(\neg P\vee Q)$
   $(P\vee Q)\wedge(\neg P\wedge(\neg P\wedge Q))\Leftrightarrow(\neg P\wedge Q)$
   b) Prove that
   $(\exists x)\,(P(x)\wedge Q(x))\Rightarrow(\exists x)P(x)\wedge(\exists x)Q(x)$ (8M+7M)

2. a) State Division algorithm and apply it for a dividend of 170 and divisor of 11.
   b) Using Fermat's theorem, find 3^{201} mod 11.
   c) Show that $2^n > n^2$ whenever n is positive integer greater than 4. (5M+5M+5M)

3. a) Show that the function
   $f(x)=\begin{cases} x/2 & \textit{when } x \textit{ is even} \\ (x-1)/2 & \textit{when } x \textit{ is odd} \end{cases}$ is primitive recursive.
   b) Let X = {a,b,c,d,e} and let C = {{a,b},{c},{d,e}}. Show that the partition C defines an equivalence relation on X. (8M+7M)

4. a) Write the Adjacency matrix and Incidence matrix for the graph in Figure 2. List the Advantages of Adjacency matrix.

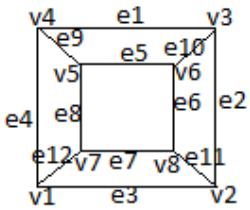

Fig: 2.

   b) Draw a complete binary tree with 19 vertices. For a complete binary tree of n vertices, give the formulae for number of leaves and internal vertices. Verify these formulae with the above tree. (8M+7M)
~~~~~~~~~~~~~~~~~~~~~~~~~

5. a) Draw eight regular graphs with six vertices. How many of them are connected.
   b) Define a planar graph. Does the graph in Figure 3 satisfy all the properties of planar graph? If so, draw the planar graph for it. (8M+7M)

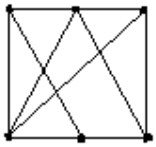

Fig: 3

6. a) Show that the groups <G, ∗> and <S,Δ> given by the following table are isomorphic.

∗	p1	p2	p3	p4
p1	p1	p2	p3	p4
p2	p2	p1	p4	p3
p3	p3	p4	p1	p2
p4	p4	p3	p2	p1

Δ	q1	q2	q3	q4
q1	q3	q4	q1	q2
q2	q4	q3	q2	q1
q3	q1	q2	q3	q4
q4	q2	q1	q4	q3

   b) Prove that the addition modulo 5 is a group. (8M+7M)

7. a) Define Binomial theorem. Find the coefficient of x^5y^7 in the expansion of $(x+3y)^{12}$.
   b) Find the number of distinct triples (x_1,x_2,x_3) of non-negative integers satisfying $x_1+x_2+x_3<15$. (7M+8M)

8. a) Solve the recurrence relation $u_n=3u_{n-1}$, $n\geq1$ using generating function.
   b) Solve the recurrence relation using the generating function.
   $a_n - 7a_{n-1} + 10a_{n-2} = 0$, $n \geq 2$, $a_0=10$, $a_1=41$. (5M+10M)

Code No: R21052 **R10** SET - 1

II B. Tech I Semester Regular Examinations, March – 2014
PROBABILITY AND STATISTICS
(Com. to CSE, IT)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~

1. a) If A and B be events with $P(A)=\frac{1}{3}, P(B)=\frac{1}{4}$ *and* $P(A\cup B)=\frac{1}{2}$.

   Find $(i).P(A/B)$ $(ii).P(B/A)$ $(iiii).P(A\cap B^c)$ $(iv).P(A/B^c)$.

   b) If $P(C)=0.65, P(D)=0.40$ and $P(C\cap D)=0.24$, are the events C and D is independent? (9M+6M)

2. a) A discrete random variable X has the following probability distribution

Value of X	0	1	2	3	4	5	6	7	8
$P(X=x)$	k	$3k$	$5k$	$7k$	$9k$	$11k$	$13k$	$15k$	$17k$

   i) Find the value of 'k'. ii) Find $P(X\le 3), P(0<X<3), P(X\ge 3)$.

   b) If the Probability density of a random variable is given by $f(x)=\begin{cases} kx^2 & 0<x<1 \\ 0 & elsewhere \end{cases}$

   Find the value of k and the probabilities that a random variable having this probability density will take on a value i) between 0.25 and 0.75; ii) greater than $2/3$. (8M+7M)

3. a) Find the mean and variance of Poisson distribution.

   b) A sample of 100 dry battery cells tested to find the length of life produced the following results: $\bar{x}=12\,hours$, $\sigma=3\,hours$.

   Assuming the data to be normally distributed, what percentage of battery cells are expected to have life

   i) More than 15 hours

   ii) Less than 6 hours

   iii) Between 10 and 15 hours? (7M+8M)
~~~~~~~~~~~~~~~~~~~~~

4. a) Determine the probability that $\overline{X}$ will be between 75 and 78 if a random sample of size 100 is taken from an infinite population having the mean $\mu = 76 \, and \, \sigma^2 = 256.$
   b) Determine a 95% confidence interval for the mean of a normal distribution with variance 0.25, using a sample of $n = 100$ values with mean 212.3. (7M+8M)

5. a) Explain briefly the following
   i) Type I error ii) Type II error iii) Critical region
   b) An urban community would like to show that the incidence of breast cancer is higher than in a nearby rural area. If it is found that 20 of 200 adult women in the urban community have breast cancer and 10 of 150 adult women in the rural community have breast cancer, can we conclude at the 0.01 level of significance that breast cancer is more prevalent in the urban community? (9M+6M)

6. a) Fit a Binomial distribution to the following data and test for the goodness of fit at 0.05 level of significance.

No. of Heads (x)	0	1	2	3	4	5
No. of Tosses (f)	38	144	342	287	164	25

   b) Construct and Explain a one-way analysis of variance table. (10M+5M)

7. a) Explain $\overline{x}$ chart and p chart briefly.
   b) A plastics manufacturer extrudes blanks for use in the manufacture of eyeglass temples. Specifications require that the thickness of these blanks have $\mu = 0.150$ *inch and* $\sigma = 0.002$ *inch.* Use the Specifications to calculate a central line and three-sigma control limits for an $\overline{x}$ chart with $n = 5.$ (10M+5M)

8. a) Explain briefly the main characteristics of Queuing system?
   b) Customers arrive at a one-man barber shop according to a Poisson process with a mean inter arrival time of 20 minutes. Customers spend an average of 15 minutes in the barber chair. If an hour is used as a unit of time, then
   i) What is the Probability that a customer need not wait for a haircut?
   ii) What is the expected number of customers in the barber shop and in the queue?
   iii) How much time can a customer expect to spend in the barber shop?
   iv) Find the average time that the customers spend in the queue. (7M+8M)

Note :- Five Statistical tables are required (i) Areas under the Standard Normal Curve from 0 to Z, (ii) Percentile Values t_p for Student's t- distribution with v degrees of freedom, (iii) Percentile Values χ_p^2 for the Chi-Square distribution with v degrees of freedom, (iv) 95th Percentile Values(0.05 levels), $F_{0.95}$ for the F- Distribution and 99th Percentile Values(0.01 levels), $F_{0.99}$ for the F Distribution and (v) Control Chart Constants.

Code No: R21052 **R10** SET - 2

II B. Tech I Semester Regular Examinations, March – 2014
PROBABILITY AND STATISTICS
(Com. to CSE, IT)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) If the probability that a communication system will have high fidelity is 0.81 and the probability that it will have high fidelity and high selectivity is 0.18.What is the Probability that a system with high fidelity will also have high selectivity?
   b) If A and B be events with $P(A \cup B) = 0.875$, $P(A \cap B) = 0.25$ *and* $P(A^c) = 0.625$.
   Find $(i).\ P(A)$ $(ii).\ P(B)$ $(iii).\ P(A \cap B^c)$
   c) Suppose a student dormitory in a college consists of the following:
   30 % are freshmen of whom 10% own a car, 40 % are Sophomores of whom 20% own a car, 20 % are Juniors of whom 40% own a car, 10 % are Seniors of whom 60% own a car. A student is randomly selected from the dormitory, if the student owns a car; find Probability that a student is Junior? (4M+6M+5M)

2. a) A discrete random variable X has the following probability distribution given below:

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

   i) Find the value of 'k'. ii) Find $P(X < 6), P(0 < X < 4)$ *and* $P(X \geq 6)$

   b) If the Probability density of a random variable is given by $f(x) = \begin{cases} x & for \quad 0 < x < 1 \\ 2 - x & for \quad 1 \leq x < 2 \\ 0 & elsewhere \end{cases}$

   Find the Probabilities that a random variable having this Probability density will take on a value i) between 0.2 and 0.8; ii) between 0.6 and 1.2. (8M+7M)

3. a) Define Moment Generating Functions. Find Moment Generating Function for Binomial distribution.
   b) Calculate the mean and S.D of a normal distribution in which 31% are under 45 and 8% are over 64. (7M+8M)

4. a) Determine the probability that $\overline{X}$ will be between 22.39 and 22.41 if a random sample of size 36 is taken from an infinite population having the mean $\mu = 22.4$ *and* $\sigma = 0.048$.
   b) The average zinc concentration recovered from a sample of zinc measurements in 36 different locations is found to be 2.6 grams per milli-litre. Find a 95% confidence intervals for the mean zinc concentration in the river. Assume that the population standard deviation is 0.3. (7M+8M)
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5. a) Explain briefly the following
   i) Level of significance ii) Critical region
   iii) Left One tailed test iv) Right one tailed test
   b) A storekeeper wanted to buy a large quantity of bulbs from two brands A and B respectively. He bought 100 bulbs from each brand A and B and found by testing that brand A had mean life time of 1120 hrs with a S.D of 75 hrs and brand B had mean life time 1062 hrs with a S.D of 82 hrs. Examine whether the difference of means is significant. Use 0.01 level of significance. (9M+6M)

6. a) Fit a Poisson distribution to the following data and test for the goodness of fit 0.05 level of significance.

x	0	1	2	3	4	5
f	275	138	75	7	4	1

   b) Construct and Explain two-way analysis of variance table. (10M+5M)

7. a) Explain briefly the R chart and the attribute chart.
   b) A plastics manufacturer extrudes blanks for use in the manufacture of eyeglass temples. Specifications require that the thickness of these blanks have $\mu = 0.150$ *inch and* $\sigma = 0.002$ *inch.* Use the specifications to calculate a central line and three-sigma control limits for an R chart with $n = 5$. (10M+5M)

8. a) Explain $(M/M/1):(\infty/FCFS)$ Queuing model.
   b) Patients arrive at the Government hospital for emergency service at the rate of one every hour. Currently, only one emergency case can be handled at time. Patients spend on average of 20 minutes receiving emergency care. The doctor wishes to have enough seats in the waiting room so that no more than about 1% of arriving patients will have to stand. Find
   i) The probability that a patient arriving at the hospital will have to wait.
   ii) The average length of the queue that forms.
   iii) Average time a patient spends in the system.
   iv) Average time a patient spends in the queue. (7M+8M)

Note :- Five Statistical tables are required (i) Areas under the Standard Normal Curve from 0 to Z, (ii) Percentile Values t_p for Student's t- distribution with v degrees of freedom, (iii) Percentile Values χ^2_p for the Chi-Square distribution with v degrees of freedom, (iv) 95th Percentile Values(0.05 levels), $F_{0.95}$ for the F- Distribution and 99th Percentile Values(0.01 levels), $F_{0.99}$ for the F Distribution and (v) Control Chart Constants.

Code No: R21052 **R10** SET - 3

II B. Tech I Semester Regular Examinations, March – 2014
PROBABILITY AND STATISTICS
(Com. to CSE, IT)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) A ball is drawn at random from a box containing 6 red balls, 4 white balls, and 5 blue balls. Determine the probability that it is red or white.
   b) If and B be events with $P(A)=0.6$, $P(B)=0.3$ *and* $P(A\cap B)=0.2$.
   $(i).\ P(A/B)$ *and* $P(B/A)$ $(ii).\ P(A\cup B)$
   $(iii).\ P(A^c)$ *and* $P(B^c)$
   c) In a Certain City, 40 percent of the people consider themselves Conservatives, 35 percent consider themselves to be Liberals, and 25 percent consider themselves to be Independents. During a Particular election, 45 Percent of Conservatives voted, 40 percent of the Liberals voted and 60 percent of the Independents are voted. If a randomly selected person voted, find the probability that the voter is Conservative? (5M+5M+5M)

2. a) A discrete random variable X has the following probability distribution

Value of X	1	2	3	4	5	6	7	8
$P(X=x)$	$2k$	$4k$	$6k$	$8k$	$10k$	$12k$	$14k$	$4k$

   i) Find the value of 'k'. ii) Find $P(X<3)$ *and* $P(X\geq 5)$
   iii) Find the distribution function of X.
   b) Find the value of k and the distribution function $F(x)$ given the probability density function of a random variable X as:
   $f(x)=\dfrac{k}{x^2+1},\ -\infty<x<\infty$ (8M+7M)

3. a) Define Moment Generating Functions. Find Moment Generating Function for Poisson distribution.
   b) An aptitude test for selecting officers in a bank is conducted on 1000 candidates. The average score is 42 and the standard deviation of score is 24. Assuming normal distribution for the scores, find
   i) The number of candidates whose scores exceed 60.
   ii) The number of candidates whose scores lie between 30 and 60. (7M+8M)

4. a) Determine the probability that $\overline{X}$ will be between 66.8 and 68.3 if a random sample of size 25 is taken from an infinite population having the mean $\mu=68$ *and* $\sigma=3$.
   b) The contents of 7 similar containers of sulfuric acid are 9.8, 10.2, 10.4, 9.8, 10.0, 10.2, and 9.6 liters. Find a 95% confidence interval for the mean of all such containers, assuming an approximate normal distribution. (7M+8M)
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5. a) Explain briefly the following:
   i) Null Hypothesis, ii) Alternative hypothesis iii) Test of hypothesis
   b) In a random sample of 100 tube lights produced by company A, the mean life time of tube light is 1190 hours with standard deviation of 90 hours. Also in a random sample of 75 tube lights from company B the mean life time is 1230 hours with standard deviation of 120 hours. Is there a difference between the mean lifetimes of the two brands of tube lights at a significance level of 0.05? (9M+6M)

6. a) In a shop study, a set of data was collected to determine whether or not the proportion of defectives produced by workers the same for the day, evening, or night shift was worked. The data were collected and shown in Table.

Shift	Day	Evening	Night
Defectives	45	55	70
Non defectives	905	890	870

   Use a 0.025 level of significance to determine if the proportion of defectives is the same for all three shifts.
   b) Construct and Explain a one-way analysis of variance table. (10M+5M)

7. a) The following are the sample means and ranges for 10 samples each of size 5. Construct a $\bar{X}$ chart and R-chart and determine whether this process is in control.

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean($\bar{X}$)	20	34	45	39	26	29	13	34	37	23
Range	23	39	15	05	20	17	21	11	40	10

   b) Explain briefly Regression. (10M+5M)

8. a) i) Explain briefly the main characteristics of Queuing system?
   ii) Explain Traffic intensity?
   b) Customers arrive at a box office window, being manned by a single individual, according to a Poisson input process with a mean rate of 20 per hour. The time required to serve a customer has an exponential distribution with a mean of 90 seconds. Find the average waiting time of a customer in the queue. Also determine the average number of customers in the system and average queue length. (7M+8M)

Note :- Five Statistical tables are required (i) Areas under the Standard Normal Curve from 0 to Z, (ii) Percentile Values t_p for Student's t- distribution with v degrees of freedom, (iii) Percentile Values χ^2_p for the Chi-Square distribution with v degrees of freedom, (iv) 95th Percentile Values(0.05 levels), $F_{0.95}$ for the F- Distribution and 99th Percentile Values(0.01 levels), $F_{0.99}$ for the F Distribution and (v) Control Chart Constants.

Code No: R21052 **R10** SET - 4

II B. Tech I Semester Regular Examinations, March – 2014
PROBABILITY AND STATISTICS
(Com. to CSE, IT)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) What is the probability of getting a total of **2 or 12** when pair of fair dice is tossed?
   b) If A and B be independent events with $P(A)=0.3$, $P(B)=0.4$.
   Find $(i).\ P(A\cap B)\ and\ P(A\cup B)$ $(ii).\ P(A/B)\ and\ P(B/A)$
   $(iii).\ P(A^c)\ and\ P(B^c)$
   c) State and Prove Baye's Theorem. (5M+5M+5M)

2. a) A discrete random variable X has the following probability distribution

Value of X	0	1	2	3	4	5	6
$P(X=x)$	k	$3k$	$5k$	$7k$	$9k$	$11k$	$13k$

   i) Find the value of 'k'. ii) Find $P(X<4), P(3<X\le 6)\ and\ P(X\ge 5)$
   iii) Find the distribution function of X.
   b) Let X have the density function $f(x)=\begin{cases}0.75\left(1-x^2\right), & if\ -1\le x\le 1\\ 0 & \text{elsewhere}\end{cases}$
   Find the distribution function. Find the Probabilities $P\left(\frac{-1}{2}\le x\le\frac{1}{2}\right) and\ P\left(\frac{1}{4}\le x\le 2\right)$.
   (7M+8M)

3. a) Find the mean and variance of Binomial distribution.
   b) Students of a class were given a mechanical aptitude test. Their grades were found to be normally distributed with mean 60 and standard deviation 5. What percent of students scored
   i) More than 60 grades? ii) Less than 56 grades?
   iii) Between 45 and 65 grades? (8M+7M)

4. a) Find $P(\bar{X}>66.75)$ if a random sample of size 36 is drawn from an infinite population with mean $\mu=63 and\ \sigma=9$.
   b) A random sample of 8 envelopes is taken from the letter box of a post office and their weights in grams are found to be: 12.1, 11.9, 12.4, 12.3, 11.5, 11.6, 12.1, and 12.4. Find 95% confidence limits for the mean weight of the envelopes received at that post office.
   (7M+8M)
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5. a) Explain briefly the following:
   i) Level of significance ii) Left One tailed test iii) Right one tailed test
   b) A manufacturer claims that the average tensile strength of thread A exceed the average tensile strength of thread B by at least 12 kilograms. To test his claim, 50 pieces of each type of thread are tested under similar conditions. Type A thread had an average tensile strength of 86.7 kilograms with known standard deviation of $\sigma_A = 6.28$ kilograms, while type B thread had an average tensile strength of 77.8 kilograms with known standard deviation of $\sigma_B = 5.61$ kilograms. Test the manufacturers claim at 0.01 level of significance. (9M+6M)

6. a) Samples of three kinds of materials, subjected to extreme temperature changes, produced the results shown in the following table:

	Material A	**Material B**	**Material C**	**Total**
Crumbled	41	27	22	90
Remained intact	79	53	78	210
Total	120	80	100	300

   Use the 0.05 level of significance to test whether, under the stated conditions, the probability of crumbling is the same for the three kinds of materials.
   b) Construct and Explain two-way analysis of variance table. (10M+5M)

7. a) The table below gives the sample means and ranges for ten samples, each of size 5. Construct the control charts for mean and range and test whether the process is in control or not.

Mean($\bar{X}$)	4.98	4.92	5.02	4.98	4.98	5.08	5.04	4.95	4.95	4.92
Range(R)	0.3	0.2	0.4	0.1	0.4	0.2	0.7	0.4	0.4	0.5

   b) Explain briefly Simple Correlation. (10M+5M)

8. a) Derive the average number of customers in the Queue.
   In $(M/M/1):(\infty/FCFS)$ model.
   b) The mean arrival rate to a service centre is 3 per hour. The mean service time is found to be 10 minutes per service. Assuming Poisson arrival and exponential service time. find
   i) Utilisation factor for this service facility.
   ii) Probability of two units in the system.
   iii) Expected number of units in the queue.
   iv) Expected time in minutes that a customer has to spend in the system. (7M+8M)

Note :- Five Statistical tables are required (i) Areas under the Standard Normal Curve from 0 to Z, (ii) Percentile Values t_p for Student's t- distribution with v degrees of freedom, (iii) Percentile Values χ_p^2 for the Chi-Square distribution with v degrees of freedom, (iv) 95th Percentile Values(0.05 levels), $F_{0.95}$ for the F-Distribution and 99th Percentile Values(0.01 levels), $F_{0.99}$ for the F Distribution and (v) Control Chart Constants).