

**III B. Tech II Semester Regular Examinations, April - 2016**  
**POWER SYSTEM ANALYSIS**  
 (Electrical and Electronics Engineering)

Time: 3 hours

Maximum Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answering the question in **Part-A** is compulsory  
 3. Answer any **THREE** Questions from **Part-B**

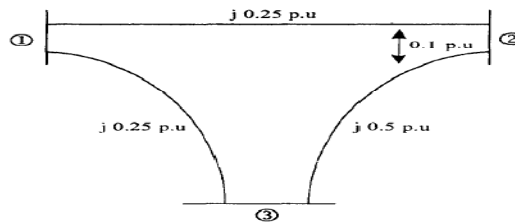
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**PART -A**

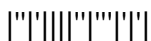
- 1 a) What is one line diagram? How the power system components are represented for it? [3M]
- b) What is the need for load flow study? [4M]
- c) What is bus impedance matrix? Mention its importance. [4M]
- d) What is the need for short circuit study (or) fault analysis? [3M]
- e) What are sequence impedances and sequence networks? [4M]
- f) Distinguish between steady state and transient stability. [4M]

**PART -B**

- 2 a) Show that the per unit equivalent impedance of a two winding transformer is the same whether the calculations is made from H.V. side or the L.V. side. [8M]
- b) What are the advantages of  $Y_{bus}$  over  $Z_{bus}$ ? [8M]
- 3 a) What are the works involved in a load flow study? [3M]
- b) With the help of a neat flow chart, explain the Newton-Raphson method of load flow solution when the system contains voltage controlled busses in addition to swing bus and load bus. [8M]
- c) Compare G-S method and N- R methods of load flow solutions. [5M]
- 4 a) Compute the bus impedance matrix for the system shown in figure below by adding element by element. Take bus (2) as reference bus. [9M]



- b) Explain the modifications necessary in the  $Z_{BUS}$  when a mutually coupled element is removed or its impedance is changed. [7M]
- 5 a) A-3-phase, 25 MVA, 11 KV alternator has internal reactance of 6%. Find the external reactance per phase to be connected in series with the alternator so that steady state short circuit current does not exceed six times the full load current. [8M]
- b) Explain the procedure for making short circuit studies of a large power system using digital computer. Illustrate the answer by considering a symmetrical fault. [8M]



- 6 a) What are the various types of faults? Discuss their frequency of occurrence and severity? Find the fault current when an L-L-G fault occurs at the terminals of an unloaded generator. [9M]
- b) Derive an expression for the positive sequence current  $I_{a1}$  of an unloaded generator when it is subjected to a double line to ground fault. [7M]
- 7 a) Explain critical clearing time and critical clearing angle, deriving the expressions. [8M]
- b) Describe the methods of improving transient stability. [8M]

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**PART -A**

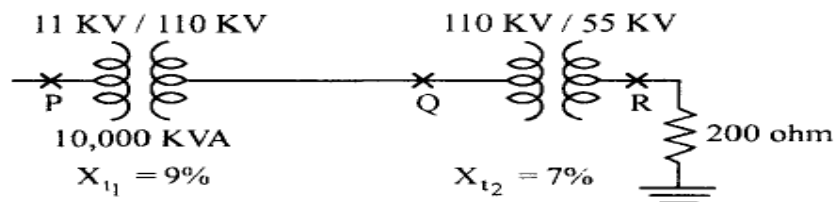
- 1 a) What is the advantage of per unit method over percent method? [3M]  
 b) What are the information's that are obtained from a load flow study? [4M]  
 c) Write the four ways of adding impedance to an existing system so as to modify bus impedance matrix. [4M]  
 d) What are the methods used for reducing short circuit current. [3M]  
 e) Define negative sequence and zero sequence components. [4M]  
 f) Define transient stability limit and steady state stability limit. [4M]

**PART -B**

- 2 a) Form  $Y_{bus}$  for the network by direct inspection method: [8M]

Element	5-1	5-2	1-2	2-3	1-4	3-6	4-6
Positive sequence reactance	0.04	0.05	0.04	0.03	0.02	0.07	0.10

- b) Consider the system shown in Figure 1. Selecting 10,000 KVA and 110 KV as base values, find the p.u. impedance of the 200 ohm load referred to 110 KV side and 55 kV side. [8M]



**Figure 1**

- 3 a) Define voltage controlled bus (generator bus/PV bus). [3M]  
 b) Explain the step by step computational procedure for the Newton-Raphson method of load flow studies. [8M]  
 c) Mention (any) three advantages of N-R method over G-S method. [5M]

- 4 Using the building algorithm construct  $Z_{BUS}$  for the system shown in figure 2. [16M]  
Choose 4 as reference bus.

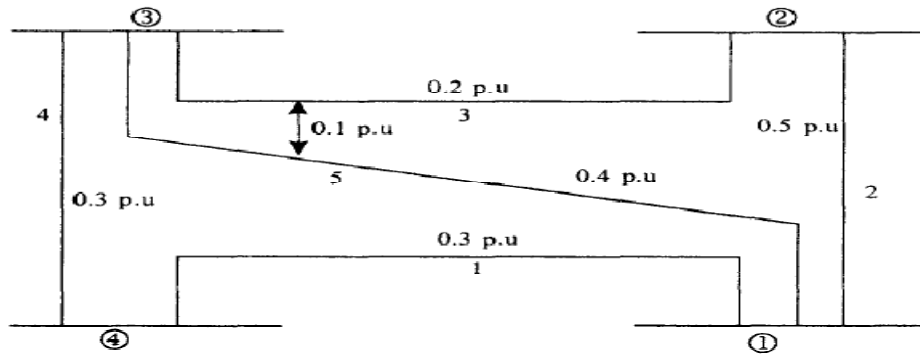


Figure 2

- 5 A 3-phase line operating at 11 KV and having a resistance of 1.5 ohm and reactance of 6 ohm is connected to a generating station bus bars through a 5 MVA step-up transformer having reactance of 5%. The bus bars are supplied by a 12 MVA generator having 25% reactance. Calculate the short circuit KVA fed into a symmetric fault [16M]  
(i) at the load end of the transformer and  
(ii) at the H.V. terminals of the transformer.
- 6 a) What are symmetrical components? Explain the symmetrical component transformation. [8M]  
b) What is meant by sequence impedance? Explain the sequence network of an unloaded generator. [8M]
- 7 a) State and explain equal area criterion. How do you apply equal area criterion to find the maximum additional load. [8M]  
b) What is meant by swing curve and how is it determined? What information is supplied by it? [8M]

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**PART -A**

- 1 a) Define the per unit terms. [3M]
- b) What are the different types of buses in a power system? [4M]
- c) What is the need of  $Z_{bus}$  building algorithm? [4M]
- d) What are the assumptions made in short circuit studies of large power system network. [3M]
- e) Write the symmetrical components of three phase system. [4M]
- f) Define the dynamic stability and transient stability. [4M]

**PART -B**

- 2 a) Obtain the per unit representation for the three-phase power system shown in figure 1 [8M]

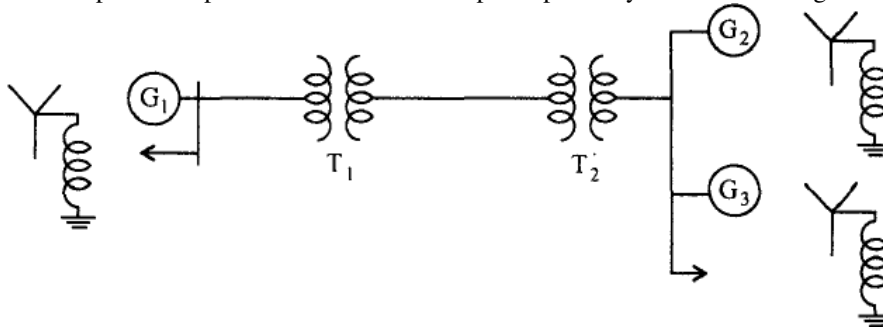
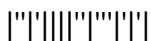


Figure 1

Generator 1 : 50 MVA; 10.5 KV;  $X = 1.8$  ohm  
 Generator 2 : 25 MVA; 6.6 KV;  $X = 1.2$  ohm  
 Generator 3 : 35 MVA; 6.6 KV;  $X = 0.6$  ohm  
 Transformer  $T_1$  : 30 MVA; 11/66 KV;  $X = 15$  ohm/phase  
 Transformer  $T_2$  : 25 MVA; 66/6.2 KV, as h.v. side  $X = 12$  ohms  
 Transmission line:  $X_L = 20$  ohm/phase

- b) Form  $Y_{bus}$  for the network by singular transformation: [8M]

Element	5-1	5-2	1-2	2-3	1-4	3-6	4-6
Positive sequence reactance	0.04	0.05	0.04	0.03	0.02	0.07	0.10



- 3 a) What is swing bus (slack bus/reference bus)? [3M]  
 b) Explain the step by step computational procedure for the Gauss-Seidel method of load flow studies [8M]  
 c) What are the advantages of Newton-Raphson method? [5M]
- 4 Consider the diagram shown in figure 2. Obtain  $Z_{bus}$  by using  $Z_{bus}$  building algorithm. [16M]

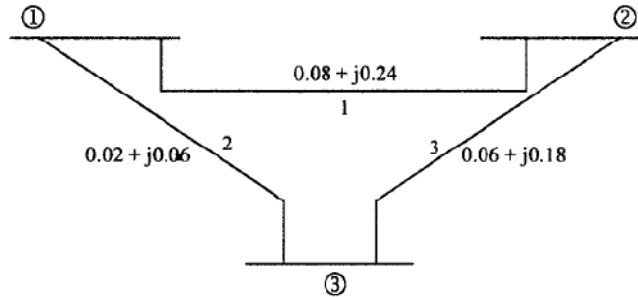


Figure 2

- 5 a) The short circuit MVA at the bus bars for a power plant A is 1200 MVA and for another plant B is 1000 MVA at 33 KV. If these two are to be interconnected by a tie-line with reactance 1.2 ohm. Determine the possible short circuit MVA at both the plants. [8M]  
 b) Explain the short circuit model of a synchronous machine under short circuit conditions. [8M]
- 6 a) A balanced 200 V, 3 phase supply feeds balanced resistive load as shown in figure 3. If the resistance  $R_{bc}$  is disconnected. Determine  $I_a$ ,  $I_b$  and  $I_c$  and symmetrical components of  $I_a$ ,  $I_b$  and  $I_c$ . [8M]

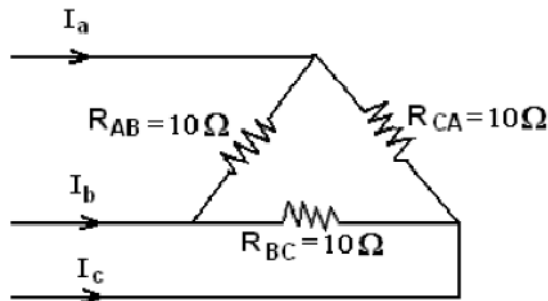
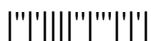


Figure 3

- b) Derive the expression for power in terms of symmetrical components. [8M]
- 7 a) Explain the equal area criterion for the stability of an alternator supplying infinite bus via an inductor interconnector. [8M]  
 b) Discuss the various methods for improving steady state stability. [8M]

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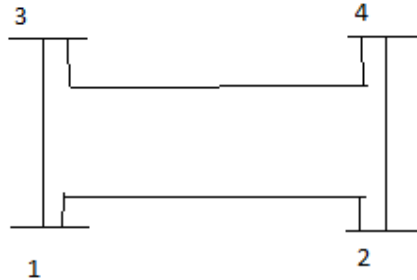
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**PART -A**

- 1 a) Give the formula to calculate base current and base impedance of a three phase system. [3M]
- b) List the quantities specified and quantities to be determined from the load flow study for the various types of buses. [4M]
- c) What are the advantages of bus impedance matrix? [4M]
- d) List out the differences in representing the power system for load flow and short circuit studies. [3M]
- e) What are symmetrical components? [4M]
- f) What are the methods used for improving steady state stability? [4M]

**PART -B**

- 2 a) Explain the importance of per-unit system. [6M]
- b) Determine the incidence matrices A, B, B', C, C' and K. From that verify the following relations for the figure 1, take 1 as ground bus [10M]  
 (i)  $C_b = -B_L^T$  (ii)  $A_b K^T = U$



**Figure 1**

- 3 b) Derive the basic equations for the load flow study using Gauss-Seidel method. With respect to this method, explain the following: [8M]  
 i) Acceleration factor.  
 ii) Handling of PV buses.
- c) What is Jacobian matrix? How the elements of Jacobian matrix are computed? [8M]



- 4 a) Form bus impedance matrix for the data given below. [11M]

Element number	Bus code	Self impedance
	From bus – To bus	
1	2-3	0.6 p.u.
2	1-3	0.5 p.u.
3	1-2	0.4 p.u.

- b) Explain the procedure for modification of  $Z_{bus}$  when a line is added or removed which has no mutual reactance. [5M]
- 5 a) There are two generating stations each which an estimated short circuit KVA of 500,000 KVA and 600,000 KVA. Power is generated at 11 KV. If these two stations are interconnected through a reactor with a reactance of 0.4 ohm, what will be the short circuit KVA at each station? [8M]
- b) What do you understand by short-circuit KVA? Explain. [8M]
- 6 a) Prove that a line to ground fault at the terminals for an alternator with solidly grounded neutral is more severe than a three phase fault. [8M]
- b) Explain the zero sequence networks of transformers with diagrams. [8M]
- 7 a) Derive the swing equation for a single machine connected to infinite bus system. State the assumptions if any and state the usefulness of this equation. Neglect the damping. [8M]
- b) Discuss the various factors affecting the transient stability of the system. [8M]

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Code No: RT32034

**R13**

SET - 1

**III B. Tech II Semester Regular Examinations, April - 2016**

**ROBOTICS**

(Mechanical Engineering)

Time: 3 hours

Maximum Marks: 70

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2. Answering the question in **Part-A** is compulsory

3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- 1 a) What are the future applications of Robot? [4M]
- b) How many degrees of freedom does a wrist have? What is the purpose of these degrees of freedom? [4M]
- c) Differentiate joint coordinates and world coordinates. [3M]
- d) Differentiate between Lagrange Euler and Newton Euler Formulation. [4M]
- e) Differentiate joint space trajectory and Cartesian trajectory planning. [4M]
- f) List the advantages and disadvantages of pneumatic actuator. [3M]

**PART -B**

- 2 a) Sketch and explain the four basic robot configurations classified according to the coordinate system. [12M]
- b) Differentiate CAD/CAM and robotics. [4M]
- 3 a) Discuss in detail the architecture of robot system. [8M]
- b) Discuss about Vacuum Grippers along with their advantages and disadvantages. [8M]
- 4 a) Determine the transformation matrix T that represents a translation of 'a' units along x-axis, followed by a rotation of  $\beta$  about x-axis and followed by a rotation of  $\Theta$  about z-axis. [8M]
- b) What is homogenous transformation matrix? Explain four sub matrices. [8M]
- 5 Determine the manipulator jacobian matrix and singularities for the 3-DOF articulated arm. [16M]
- 6 What are the common types of motion that a robot manipulator can make in travelling from point to point? [16M]
- 7 a) Explain the various drive system used with an industrial robot and compare their features, merits and demerits. [8M]
- b) Describe the various considerations taken into account for material handling. [8M]

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**III B. Tech II Semester Regular Examinations, April - 2016**  
**ROBOTICS**

(Mechanical Engineering)

Time: 3 hours

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**PART -A**

- |   |    |   |      |
|---|----|---|------|
| 1 | a) | Differentiate flexible automation and fixed automation. | [4M] |
|   | b) | What are the types of End effectors?                    | [3M] |
|   | c) | Differentiate forward and inverse kinematics.           | [4M] |
|   | d) | What do you mean by Torque sensor?                      | [3M] |
|   | e) | List out different robot programming languages.         | [4M] |
|   | f) | What features are required for robot in spray painting? | [4M] |

**PART -B**

- |   |    |  |       |
|---|----|--|-------|
| 2 | a) | What is the importance of Automation in industry? Explain.   | [8M]  |
|   | b) | Describe the classification of robots by control system.   | [8M]  |
| 3 | a) | Discuss in detail about Magnetic gripper with neat sketch.   | [8M]  |
|   | b) | What do you understand by degree of freedom (DOF)? How many DOFs are required to position an end effector at any point in 3-D space?                                       | [8M]  |
| 4 |    | For the point [3 7 5] perform the following operations:  | [16M] |
|   | a) | Rotate $30^0$ about X-axis   |       |
|   | b) | Translate 8 units along y-axis   |       |
|   | c) | Rotate $30^0$ about x then translate 6 units along Y- axis.  |       |
|   | d) | Rotate $90^0$ about z-axis.  |       |
| 5 | a) | What are the singularities of a manipulator? How are they classified?  | [8M]  |
|   | b) | How will you compute Jacobian for a rotary Joint?  | [8M]  |
| 6 | a) | Write down the capabilities and limitations of Lead through methods.   | [8M]  |
|   | b) | A single cubic trajectory given by $q(t)= 30+t^2-6t^3$ is used for a period of 3 seconds. Determine starting and final position, velocity and acceleration of endeffector. | [8M]  |
| 7 | a) | Briefly explain the working principle of any two types of position sensors with neat sketch.   | [8M]  |
|   | b) | Explain use of robot in assembly operation.  | [8M]  |

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Code No: RT32034

**R13**

**SET - 3**

**III B. Tech II Semester Regular Examinations, April - 2016**

**ROBOTICS**

(Mechanical Engineering)

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**PART -A**

- 1 a) Give the classification of robot by control system. [3M]
- b) What do you mean by magnetic gripper? [4M]
- c) Define DH parameters. [4M]
- d) What do you mean by Jacobian matrix? [3M]
- e) What are the software packages available for robot programming? [4M]
- f) What features are required for robot in spot welding? [4M]

**PART -B**

- 2 a) Explain how robotics is a technology for future. [8M]
- b) What are types of automation? Explain them with examples. [8M]
- 3 a) Discuss in detail factors considered while selection and design of grippers. [10M]
- b) What are the different components of industrial robotics? [6M]
- 4 a) What is the role of D-H notation? Explain their importance in solving Forward Kinematics. [8M]
- b) Write homogenous transformation matrices for rotation in 3D. [8M]
- 5 a) Make a comparison of Newton-Euler and Lagrange-Euler formulations and state the situation when you will prefer Newton-Euler and when you will prefer Lagrange-Euler formulation. [8M]
- b) For a given manipulator, the velocity Jacobian and the static force jacobian different? Explain your answer. [8M]
- 6 a) Explain the steps involved in Trajectory planning. [8M]
- b) Discuss the SPEED control commands of Robot languages. [8M]
- 7 a) Describe the Spray coating operation with robot system. [8M]
- b) Explain the working of a stepper motor. [8M]

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(Mechanical Engineering)

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**PART -A**

- |   |    |  |      |
|---|----|--|------|
| 1 | a) | Differentiate servo controlled robot and non-servo controlled robot? | [3M] |
|   | b) | What are the limitations of Adhesive gripper?                        | [4M] |
|   | c) | What do you mean by homogeneous transformation?                      | [3M] |
|   | d) | What do you mean by manipulator jacobian?                            | [4M] |
|   | e) | What are the methods of teaching a robot?                            | [4M] |
|   | f) | What are the limitations of potentiometer?                           | [4M] |

**PART -B**

- |   |     |   |       |
|---|-----|---|-------|
| 2 | a)  | What is the work envelope of a robot sketch and explain two views to indicate the work envelope of a cylindrical robot.   | [8M]  |
|   | b)  | Differentiate Hard automation and Flexible automation using robot.  | [8M]  |
| 3 |     | Explain mechanical grippers and their linkage mechanisms with neat sketches.  | [16M] |
| 4 | a)  | Explain the implementation of DH notation for a links coordinate system and joint parameters.   | [10M] |
|   | b)  | What are fundamental rotation matrices?   | [6M]  |
| 5 |     | Determine the equations of motion for 2DOF RR- planar manipulator arm using Lagrange-Euler Formulation.   | [16M] |
| 6 |     | A jointed - arm robot of configuration RRR is to move all three axes so that the first joint is rotated through $50^0$ , the second joint is rotated through $90^0$ and the third joint is rotated through $25^0$ . Maximum speed of any of these rotational joints is 100 mm/s. Ignore effects of acceleration and deceleration. | [16M] |
|   | i)  | Determine the time required to move each joint if skew motion is used.  |       |
|   | ii) | Determine the time required to move the arm to the desired position and the rotational velocity of each joint, if joint - interpolation motion is used.   |       |
| 7 | a)  | Explain application of robot in robot continuous arc welding.   | [8M]  |
|   | b)  | Explain the importance of Robot in Spot Welding.  | [8M]  |

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**III B. Tech II Semester Regular Examinations, April - 2016**  
**DESIGN AND ANALYSIS OF ALGORITHMS**  
(Common to CSE and IT)

Time: 3 hours

Max. Marks: 70

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**PART -A**

- 1 a) Distinguish between Algorithm and Psuedocode. [3M]
- b) Describe the Algorithm Analysis of Binary Search. [4M]
- c) State the Job – Sequencing Deadline Problem. [4M]
- d) Define i) Principles of optimality ii) Feasible solution iii) Optimal solution. [3M]
- e) Write the Control Abstraction of iterative Backtracking method. [4M]
- f) Distinguish between fixed – tuple sized and variable tuple sized state space tree organization. [4M]

**PART -B**

- 2 a) Explain the properties of an algorithm with an example. [4M]
- b) Give the algorithm for matrix multiplication and find the time complexity of the algorithm using step – count method. [8M]
- c) Differentiate between Bigoh and omega notation with example. [4M]
- 3 a) What is meant by Divide – and – Conquer approach? [3M]
- b) Write Divide – And – Conquer recursive Merge sort algorithm and derive the time complexity of this algorithm. [8M]
- c) Write the General method of Divide – And – Conquer approach. [5M]
- 4 a) State the Greedy Knapsack? Find an optimal solution to the Knapsack instance  $n=3, m=20, (P1, P2, P3) = (25, 24, 15)$  and  $(W1, W2, W3) = (18, 15, 10)$ . [8M]
- b) What is a Spanning tree? Explain Prim's Minimum cost spanning tree algorithm with suitable example. [8M]
- 5 a) Draw an Optimal Binary Search Tree for  $n=4$  identifiers  $(a1,a2,a3,a4) = (do,if, read, while)$   $P(1:4)=(3,3,1,1)$  and  $Q(0:4)=(2,3,1,1,1)$ . [9M]
- b) Explain how Matrix – chain Multiplication problem can be solved using dynamic programming with suitable example. [7M]
- 6 a) What is a Hamiltonian Cycle? Explain how to find Hamiltonian path and cycle using backtracking algorithm. [8M]
- b) Discuss the 4 – queen's problem. Draw the portion of the state space tree for  $n = 4$  queens using backtracking algorithm. [8M]
- 7 a) Give the 0/1 Knapsack LCBB algorithm. Explain how to find optimal solution using variable – tuple sized approach. [9M]
- b) Distinguish between backtracking and branch – and bound techniques. [7M]

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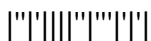
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**PART -A**

- 1 a) Define i) Profiling ii) Time Complexity iii) Space Complexity. [3M]
- b) State the Greedy Knapsack Problem. [4M]
- c) Distinguish between Prim's and Kruskal's Spanning tree algorithm. [4M]
- d) Draw all possible binary search trees for the identifier set (do, if, stop). [4M]
- e) Define Chromatic number & Give the state space tree for 4 – coloring problem. [4M]
- f) Define Bounding Function? Give the statement of 0/1 Knapsack FIFO BB. [3M]

**PART -B**

- 2 a) What are the different mathematical notations used for algorithm analysis. [4M]
- b) Give the algorithm for transpose of a matrix  $m \times n$  and determine the time complexity of the algorithm by frequency – count method. [8M]
- c) Discuss the Amortized analysis with an example. [4M]
- 3 a) What are the advantages and disadvantages of Divide – And – Conquer? [3M]
- b) Write Divide – And – Conquer recursive Quick sort algorithm and analyze the algorithm for average time complexity. [8M]
- c) Derive the time complexity of Quick sort algorithm for worst case. [5M]
- 4 a) State the Job – Sequencing with deadlines problem. Find an optimal sequence to the  $n=5$  Jobs where profits  $(P_1, P_2, P_3, P_4, P_5) = (20, 15, 10, 5, 1)$  and deadlines  $(d_1, d_2, d_3, d_4, d_5) = (2, 2, 1, 3, 3)$ . [8M]
- b) What is a Minimum Cost Spanning tree? Explain Kruskal's Minimum cost spanning tree algorithm with suitable example. [8M]
- 5 a) Explain Reliability Design Problem with suitable example. [7M]
- b) Describe the Dynamic 0/1 Knapsack Problem. Find an optimal solution for the dynamic programming 0/1 knapsack instance for  $n=3$ ,  $m=6$ , profits are  $(p_1, p_2, p_3) = (1, 2, 5)$ , weights are  $(w_1, w_2, w_3) = (2, 3, 4)$ . [9M]
- 6 a) Write an algorithm for N – queen's problem. Give time and space complexity for 8 – queen's problem. [8M]
- b) Give the statement of sum –of subsets problem. Find all sum of subsets for  $n=4$ ,  $(w_1, w_2, w_3, w_4) = (11, 13, 24, 7)$  and  $M=31$ . Draw the portion of the state space tree using fixed – tuple sized approach. [8M]



- 7 a) What is LC – Search? Discuss LC – Search algorithm. [7M]
- b) Explain Travelling sales person problem LCBB procedure with the following instance and draw the portion of the state space tree and find an optimal tour. [9M]

$$\begin{pmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{pmatrix}$$

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**III B. Tech II Semester Regular Examinations, April - 2016**  
**DESIGN AND ANALYSIS OF ALGORITHMS**  
(Common to CSE and IT)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. Answering the question in **Part-A** is compulsory  
3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- 1 a) Describe & Define any three Asymptotic Notations. [3M]
- b) Write Control Abstraction of Divide – and – Conquer. [4M]
- c) Find an optimal solution to the knapsack instance n=4 objects and the capacity of knapsack m=15, profits (10, 5, 7, 11) and weight are (3, 4, 3, 5). [4M]
- d) Distinguish between Dynamic Programming and Greedy method. [4M]
- e) What is a Backtracking and give the 4 – Queens’s solution. [4M]
- f) Define : i) LC – Search ii) Branch and Bound (BB) iii) FIFO – BB. [3M]

**PART -B**

- 2 a) Explain the performance Analysis. [4M]
- b) Give the algorithm for matrix additions and determine the time complexity of this algorithm by frequency – count method. [8M]
- c) Discuss the Pseudo code conventions for expressing algorithms. [4M]
- 3 a) Distinguish between Merge sort and quick sort. [3M]
- b) Explain Recursive Binary search algorithm with suitable examples. [8M]
- c) Discuss the time complexity of Binary search algorithm for best and worst case. [5M]
- 4 a) Find an optimal solution to the knapsack instance n=7 objects and the capacity of knapsack m=15. The profits and weights of the objects are (P1,P2,P3, P4, P5, P6, P7)= (10, 5,15,7,6,18,3) (W1,W2,W3,W4,W5,W6,W7)=(2,3,5,7,1,4,1) [8M]
- b) Discuss the single – source shortest paths algorithm with suitable example. [8M]
- 5 a) What is All – Pair Shortest Path problem (APSP)? Discuss the Floyd’s APSP algorithm and discuss the analysis of this algorithm. [9M]
- b) What is principle’s of optimality? Explain how travelling sales person problem uses the dynamic programming technique with example. [7M]
- 6 a) Write control abstraction for backtracking. [7M]
- b) Explain the Graph – coloring problem. And draw the state space tree for m= 3 colors n=4 vertices graph. Discuss the time and space complexity. [9M]
- 7 a) Write Control Abstraction of Least – Cost(LC) Search. [7M]
- b) Explain the FIFO BB 0/1 Knapsack problem procedure with the knapsack instance for n=4.m=15,(p1,p2,p3,p4)=(10,10,12,18) (w1,w2,w3,w4) =(2, 4, 6, 9). Draw the portion of the state space tree and find optimal solution. [9M]

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**III B. Tech II Semester Regular Examinations, April - 2016**  
**DESIGN AND ANALYSIS OF ALGORITHMS**  
(Common to CSE and IT)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. Answering the question in **Part-A** is compulsory  
3. Answer any **THREE** Questions from **Part-B**

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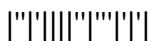
**PART -A**

- 1 a) Describe Different characteristics of an algorithm. [3M]
- b) Distinguish between Divide and conquer and Greedy method. [4M]
- c) Write Control Abstraction of Greedy method. [4M]
- d) Give the statement of Reliability design problem. [4M]
- e) Define : i) State Space tree ii) E – Node and iii) Dead Node. [3M]
- f) Write the Control Abstraction of Least – Cost Branch and Bound. [4M]

**PART -B**

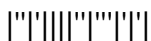
- 2 a) Explain recursive functions algorithm analysis with an example. [4M]
- b) Explain the method of determining the complexity of procedure by the step count approach. Illustrate with an example. [8M]
- c) Give the Big – O notation definition and briefly discuss with suitable example. [4M]
- 3 a) What is stable sorting method? Is Merge sort a stable sorting method? [3M]
- b) Explain partition exchange sort algorithm and trace this algorithm for n =8 elements: 24,12, 35, 23,45,34,20,48 [8M]
- c) Write non – recursive binary search algorithm? [5M]
- 4 a) Explain differences between Prim’s and Kruskal’s Minimum spanning Tree algorithm. Derive the time complexity of Kruskal’s algorithm. [8M]
- b) Discuss the Dijkstra’s single source shortest path algorithm and derive the time complexity of this algorithm. [8M]
- 5 a) Construct an optimal travelling sales person tour using Dynamic Programming. [9M]

0	10	9	3
5	0	6	2
9	6	0	7
7	3	5	0
- b) Discuss the time and space complexity of Dynamic Programming traveling sales person algorithm. [7M]
- 6 a) What is a backtracking? Give the explicit and implicit constraints in 8 queen’s problem. [8M]
- b) Draw the portion of state space tree for 4 queen’s problem using variable – tuple sized approach. [8M]



- 7 a) Draw the portion of state space tree generated by FIFOBB for the job sequencing with deadlines instance  $n=5$ ,  $(p_1, p_2, \dots, p_5) = (6, 3, 4, 8, 5)$ ,  $(t_1, t_2, \dots, t_5) = (2, 1, 2, 1, 1)$  and  $(d_1, d_2, \dots, d_5) = (3, 1, 4, 2, 4)$ . What is the penalty corresponding to an optimal solution. [8M]
- b) Draw the portion of state space tree generated by LCBB for the 0/1 Knapsack instance:  $n = 5$ ,  $(p_1, p_2, \dots, p_5) = (10, 15, 6, 8, 4)$ ,  $(w_1, w_2, \dots, w_5) = (4, 6, 3, 4, 2)$  and  $m=12$ . Find an optimal solution using fixed – tuple sized approach. [8M]

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Code No: R32024

**R10**

**Set No. 1**

**III B.Tech II Semester Supplementary Examinations, April - 2016**  
**MICROPROCESSORS AND MICRO CONTROLLERS**  
(Electrical and Electronics Engineering)

**Time: 3 hours**

**Max. Marks: 75**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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- 1 a) Explain the physical address calculation in 8086 microprocessor. [8]  
b) What is memory segmentation? Explain different segments of 8086 microprocessor. [7]
- 2 a) How 8086 enters into its maximum mode of operation? Discuss the use of maximum mode of operation of 8086. [7]  
b) Explain different machine language instruction formats. [8]
- 3 a) Write an assembly language program to arrange the given 16-bit hexadecimal numbers in ascending order. [8]  
b) Explain the implementation of the IF-THEN-ELSE feature in 8086 programming. [7]
- 4 a) What is the need for Input/Output ports in microprocessor based systems? [5]  
b) Explain the architecture and various modes of operation of 8255. [10]
- 5 What is the need for programmable interrupt controller? Draw and discuss the internal architecture of programmable interrupt controller. [15]
- 6 a) Discuss the advantages of microcontroller based systems over microprocessor based systems. [6]  
b) What are timers and counters? What is its need? Briefly explain the timers of 8051 microcontroller. [9]
- 7 a) What is an addressing mode? List the major addressing modes of 8051. [8]  
b) List and explain different arithmetic instructions of 8051 microcontroller with examples. [7]
- 8 a) What is A to D converter? What is its use? Explain. [7]  
b) Discuss the interfacing of Push button to 8051 microcontroller. [8]

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Code No: R32034

**R10**

**Set No. 1**

**III B.Tech II Semester Supplementary Examinations, April - 2016**  
**INSTRUMENTATION & CONTROL SYSTEMS**  
**(Mechanical Engineering)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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- 1 a) Describe the terms Linearity, Repeatability and calibration. [8]  
b) Explain why is it preferable to plot a straight line relationship between two variables although their relationship may be of non linear form. [7]
- 2 a) Explain the different principles of working of capacitive transducers. [8]  
b) Explain any one of the electrical resistance thermometer. [7]
- 3 a) What should be done when measuring the pressure of corrosive material and the gauge is not designed for that? [6]  
b) A McLeod gauge has a capillary of 1mm diameter and a bulb of 100 c.c. Calculate the pressure indicated by a reading of 20 mm. What error would result in the measurement if the volume of capillary is dropped in comparison with the volume of the bulb? [9]
- 4 a) What precautions in the use of pressure gauges must be observed when using such gauges to measure level? [8]  
b) Why the resistivity of the liquid has any effect upon the operation of a magnetic flow meter? [7]
- 5 a) Explain hologram recording process with a sketch. [8]  
b) Explain the Working principle of Seismic instruments. [7]
- 6 a) Explain the strain–gauge calibration with a circuit. [8]  
b) Explain strain gauge rosettes. [7]
- 7 a) Explain Water Vapour recorder with a sketch. [8]  
b) Explain mechanical torsion meter and derive its equation. [7]
- 8 a) Explain automatic electronic psychrometer. [8]  
b) Explain speed and position control system. [7]

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Code No: R32054

# R10

<b>Set No. 1</b>
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**III B.Tech II Semester Supplementary Examinations, April - 2016**

**UNIX PROGRAMMING  
(Common to CSE and IT)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any FIVE Questions  
All Questions carry equal marks**

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- 1 a) Write about mv command and its options. 4M  
b) If a directory has the permissions 777 and a file in it has the permissions 000, write the security implications from this. 5M  
c) Write the command which sorts a list of files and removes duplicates lines and finally writes the result into an output file. 6M
- 2 a) Write about string comparison operations in shell programming. 7M  
b) Write a shell script to display Good Morning, Good After Noon and Good Evening according on the present time. 8M
- 3 a) Write about lseek() system call. 3M  
b) Write about dup() and dup2() system calls. 6M  
c) Write a C program to scan current directory and to print its contents. 6M
- 4 a) What is a Zombie process? Explain with an example. 7M  
b) Write about the following System function calls. 8M  
i) execl() ii) execlp() iii) execve() iv) execvp()
- 5 a) Write about fork and vfork functions. 7M  
b) Write a C program to echo all command-line arguments and all environment strings. 8M
- 6 a) Write about kill and raise functions with its correct syntaxes. 8M  
b) What is reentrant function? Explain in detail. 7M
- 7 a) Write about popen() and pclose() functions. 7M  
b) Write about message queues. 8M
- 8 a) Explain Byte-Ordering, address format and address lookup in Sockets. 9M  
b) Explain how the addresses are associated with Sockets. 6M

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Code No: V3207

**R07**

**Set No. 1**

**III B.Tech II Semester Supplementary Examinations, April - 2016**  
**MICRO PROCESSORS AND MICRO CONTROLLERS**  
**(Electronics and Electrical Engineering)**

**Time: 3 hours**

**Max. Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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- 1 a) Explain the timing diagrams of minimum mode operation. [8]  
b) Distinguish between the terms microprocessor, microcomputer and micro-controller. Write about the evolution of microprocessor? [8]
- 2 a) List out various assembler directives used in ALP of 8086 microprocessor. [8]  
b) Write standard programming of 8086 for WHILE DO and IF-THEN-ELSE. [8]
- 3 a) Explain the digital to digital converter. [8]  
b) Explain the Programmed I/O and Interrupt driven I/O in detail. [8]
- 4 Describe the cascaded mode operation of 8259 with a neat block diagram. [16]
- 5 a) Write short notes on synchronous serial data communication? [8]  
b) Give an overview of RS-232 serial data standard? [8]
- 6 a) Explain the major components in 8051 microcontroller architecture. [8]  
b) Give the 8051 instruction format. [8]
- 7 a) Describe the hardware features of 8051. [8]  
b) Enlist the salient features of 8051 family of microcontrollers. [8]
- 8 a) Explain the operation of push button. [8]  
b) Briefly Explain interfacing seven segment displays? What are its applications? [8]

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