Code : 17CS1102

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

ADVANCED COMPUTER ARCHITECTURE

(Computer Science and Engineering)

Time : 3 hours Max. Marks: 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*

All Questions carry equal marks

* * *

SECTION-I

1. Explain basic five-stage instruction execution pipelining and list the data hazards in pipelining.

2. Write about Virtual Memory and explain Paging Systems with a neat diagram.

SECTION – II

3. Explain the following .

   (a) Reorder Buffer (b) Instruction window

4. Explain VLIW/EPIC processor with a neat diagram.

SECTION –III

5. Briefly explain Instruction Issue and Scheduling.

6. Describe Memory Access Instructions in detail.

SECTION –IV

7. Draw and explain Basic Page-mode DRAM.

8. Describe and explain basic three-state write-invalidate snooping protocol in cache coherence.

SECTION –V

9. Define single process multithread and explain various types of single process multithreads.

10. Write notes on the following

    (a) Monitoring (b) Triggering.

Code : 17CS1101

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

ADVANCED DATA STRUCTURES AND ALGORITHMS

(Computer Science and Engineering)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

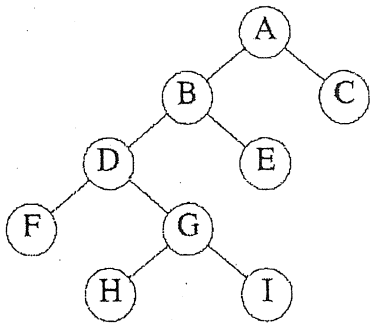
1 (a) What is a Circular list? Write a program to search in a circular linked list that has a header node?

(b) Define Queue. Write the advantages and disadvantages of Queues.

2 With the help of suitable examples, explain the various asymptotic notations.

SECTION - II

3 (a) Define binary tree. Give the array representation for the following binary tree and traverse the tree using in-order, preorder and post-order.



(b) Explain about different graph storage representations with example.

4 (a) Explain how AVL tree is different from the binary search tree.

(b) Define B-tree. Generate a B tree of order 3 (2-3 tree) for the following key values 25, 10, 12, 15, 39, 64, 53.

SECTION - III

5 (a) Write the advantages of splay tree in representation of dictionaries.

(b) What are the advantages of using modulo arithmetic for building hash functions?

6 (a) What is hashing? Explain any three collision resolution techniques with example.

(b) Write short notes on red black trees.

SECTION - IV

7 (a) Explain the principle of Divide-and-conquer technique.

(b) Derive the complexity of Strassen's matrix multiplication.

8 (a) Find an optimal solution for the following knapsack problem:
n=3, m=20, (P1, P2, P3) = (25, 24, 15) and (W1, W2, W3) = (18, 15, 10)

(b) Explain how to find minimum cost spanning tree by using prim's algorithm?

SECTION - V

9 (a) Describe travelling sales person problem.

(b) Give the algorithm for 0/1 knapsack using dynamic programming technique.

10 (a) Explain graph coloring with example.

(b) Device an algorithm for least cost answer node using FIFO branch and bound.

Code : 17CS1103

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

OBJECT ORIENTED ANALYSIS AND DESIGN
(Computer Science & Engineering)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks
* * *

SECTION - I

1 (a) Explain the structural things in UML
(b) Discuss about modeling systems architecture.

2 (a) Distinguish between interface and class.
(b) State and explain the common mechanisms in the UML.

SECTION - II

3 (a) Discuss various uses of object diagram.
(b) Discuss how classes can be used for modeling the non-software things and modeling primitive types.

4 (a) Explain with an example how to depict an asynchronous message
(b) What is meant by state machine? Discuss about sequential substates and history states with an example.

SECTION - III

5 (a) Distinguish between action state and activity state.
(b) Draw a Sequence diagrams for via Net Bank ATM system.

6 Distinguish signals and active classes.

SECTION - IV

7 (a) How to model life time of an object.
(b) Discuss about artifact diagrams.

8 (a) What is meant by frame work?
(b) Explain with an example about modeling structured relationships.

SECTION - V

9 Describe User Satisfaction Test?

10 Describe the Process of creating the Access Layer Classes with an example?

Code : 17CS1104

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

ADVANCED DATABASE MANAGEMENT SYSTEMS

(Computer Science & Engineering)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1 a) Define Data Independence ? How Physical Data Independence differs with Logical Data Independence.

b) What is an E-R Model? Draw the E-R Model for Banking System.

2 a) What Data Models represents ? Discuss about Relational Data Model.

b) Write about Database Languages.

SECTION - II

3 a) What is an FD ? Give the Inference Rules of Functional Dependencies.

b) Explain External Merge Sort algorithm with an example.

4 a) Explain 2NF with an Example.

b) Consider the Relational Schema R(ABCDEFGH) and the FD's

A->BC
C->D
E->A
F->GH

Determine whether the Decomposition of R into (EABCD) (FGH) (EF) is Lossless and Dependency Preserving

SECTION - III

5 Describe the Object Model of ODMG in detail.

6 a) How to Specify Object Persistence via Naming and Reachability? Discuss.

b) Write a Short note on Object Definition Language.

SECTION - IV

7 a) Discuss the types of Discretionary Privileges.

b) Explain ECA Model for Active Databases rules with an example.

8 a) How to Propagate the privileges using the GRANT Option ? Explain with an example.

b) Outline the Concept Temporal Databases.

SECTION - V

9 a) Illustrate Mobile Computing Architecture with a neat sketch.

b) Write a Short note on Multimedia Data Management Issues.

10 a) What are the problems and future issues in GIS? Discuss.

b) Outline the Summary of Major Genome-Related Databases.

Code : 17CS1105

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

CRYPTOGRAPHY & NETWORK SECURITY

(Computer Science & Engineering)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION – I

1. (a) Define Threat and attack
   (b) Explain the basic principles in the design of Block ciphers
   (c) Differentiate DES with triple DES

2. (a) With neat sketch explain network access model
   (b) What is meant by attack model? Explain in detail

SECTION - II

3. (a) List the characteristics of Public key cryptography
   (b) Show how RSA fails for chosen cipher text attack

4. (a) Define Elliptic curve discrete logarithm problem
   (b) How elliptic curves are suitable for cryptography state with reasons

SECTION - III

5. (a) Explain how Fermat theorem helps in primality testing
   (b) What is the role of Euler tuotient function in RSA?

6. Explain how to find multiplicative inverse of an element using extended Euclidean algorithm with example

SECTION-IV

7. (a) Differentiate HMAC and NMAC
   (b) Why DSA is computationally faster when compared to ElGamal signature scheme?

8. (a) How to achieve entity authentication using challenge response protocol
   (b) List the requirement of Digital Signature Schemes

SECTION - V

9. (a) Define security association

   (b) Explain SSL hand shake protocol and alert protocol

10. (a) Differentiate connection vs session

    (b) List and explain the algorithms used in SSL record protocol

Code :17CS11E3

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

ADVANCED OPERATING SYSTEMS
(COMPUTER SCIENCE & ENGINEERING)

Time : 3Hrs Max. Marks : 60

*Answer Five Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1. (a) Explain Advantages of Distributed systems over Centralized systems.
   (b) Explain about Switched Multiprocessors.

2. (a) Discuss about Layered Protocols in Distributed Systems.
   (b) Explain the Client – Server Model.

SECTION – II

3. (a) What is the need of Clock synchronization in distributed system.
   (b) Explain Atomic transactions.

4. (a) What is Dead lock? Explain the dead lock handling in a Distributed System Environment is different from that in a Conventional Environment.
   (b) Discuss about Processor allocation in distributed systems.

SECTION – III

5. (a) Explain File Service interface in distributed file system design.
   (b) Discuss about Caching in distributed file systems.

6. (a) Explain the semantics of File sharing.
   (b) Explain about Shared Memory concept.

SECTION – IV

7 (a) Explain about On –Chip Memory.
   (b) Explain about Strict Consistency model.

8 Explain about page based distributed shared memory concept.

SECTION – V

9 Explain process Management and Memory management in MACH.

10 (a) Explain about DCE Threads.
   (b) Discuss about Time service.

LB

Code : 17SH1101

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

PROBABILITY & STATISTICS AND COMPUTATIONAL TECHIQUES
(Power System)

Time : 3 hours Max. Marks: 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks
* * *

SECTION – I

1 (a) A certain type of storage battery lasts, on average, 3.0 years with a standard deviation of 0.5 years. Assuming that battery life is normally distributed, find the probability that a given battery will last less than 2.3 years.

(b) An electrical firm manufactures light bulbs that have a life, before burn-out, that is normally distributed with mean equal to 800 hours and a standard deviation of 40 hours. Find the probability that a bulb burns between 778 and 834 hours.

2 (a) Obtain Moment Generating function of poisson distribution and deduce mean and variance using M.G.F only.

(b) State and Prove Normal distribution is the limiting case of Binomial distribution.

SECTION – II

3 (a) A random sample of 100 recorded deaths in the United Stated during the past years showed an average life span of 71.8 years. Assuming a population standard deviation of 8.9 years, does this seem to indicate that the mean life span today is greater than 70 years? Use a 0.05 level of significance.

(b) A manufacture of sports equipment has developed a new synthetic fishing line that the company claims has mean breaking strength of 8 kilograms with a standard deviation of 0.5 kilogram. Test the hypothesis that $\mu = 8$ kilograms against the alternative that $\mu \neq 8$ kilograms if a random sample of 50 lines is tested and found to have a mean breaking strength of 7.8 kilograms. Use a 0.01 level of significance.

4 (a) Two samples of sizes 9 and 8 give the sum of squares of deviation from the respective means equal to 160 $inch^2$ and 91 $inch^2$ respectively. Can theses be regarded drawn from the same normal population with the same variance?

(b) A machine is supposed to produce washers of mean thickness 0.12cm. A sample of 10 washers was found to have a mean thickness 0.128cm and standard deviation 0.008cm.Test whether the machine is working in proper order at 5% level of significance.

SECTION – III

5 (a) Find a real root of the equation $\sin^2 = x = x^2 - 1$ correct to four significant figures by the iterative method.

(b) Find the approximate root to three decimal places of the equation $x^3 - 2x - 5 - 0$ by bisection method.

6 (a) The table gives the values of tan x for $0.10 \le x \le 0.30$.

x	0.10	0.15	0.20	0.25	0.30
$y = \tan x$	0.1003	0.1511	0.2027	0.2553	0.3093

Find (i) tan 0.12 (ii) tan 0.26 by Newton forward interpolation.

(b) Apply languages interpolation formulae and estimate $f(32)$ from the following table

x	25	30	35	40
$y = f(x)$	0.2707	0.3027	0.3386	0.3794

SECTION – IV

7 (a) Fit a Polynomial of the second degree to the following table.

x	0	1.0	2.0
y	1.0	6.0	17.0

(b) Use the method of least squares to fit the straight line $y = a + bx$ to the data.

x	0	1	2	3
y	2	5	8	11

8 (a) Evaluate $I = \int_0^1 \frac{1}{1+x}\,dx$.

(b) Use Romberg's method to compute $I = \int_0^1 \frac{1}{1+x}\,dx$ correct to three decimal places.

SECTION – V

9 Given $\frac{dy}{dx} = 1 + y^2$, where $y = 0$ when $x = 0$, find $y(0.2), y(0.4)$ and $y(0.6)$ using Runge-Kutta Method.

10 The differential equation $y' = x^2 + y^2 - 2$ satisfies the following data:

x	y
0.1	1.0900
0	1.0000
0.1	0.8900
0.2	0.7605

Use Milne's method to obtain the value of $y(0.3)$.

Code : 17PS1101

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

COMPUTER METHODS IN POWER SYSTEMS
(Power Systems)

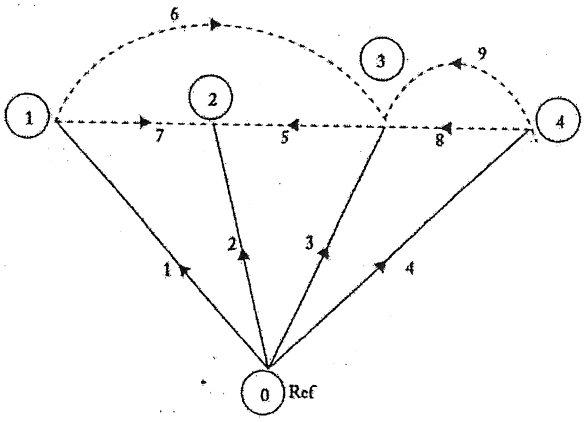
Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

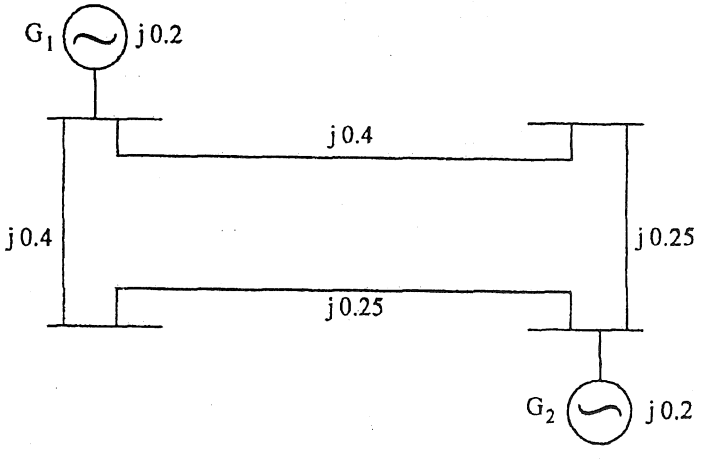
* * *

SECTION - I

1 For the oriented graph shown in the figure below, formulate element-node incidence matrix, bus-incidence matrix, basic cut-set incidence matrix, and basic-loop incidence matrix.



2. (a) Form the Y_{BUS} by using singular transformation for the network shown in Fig. below including the generator buses.



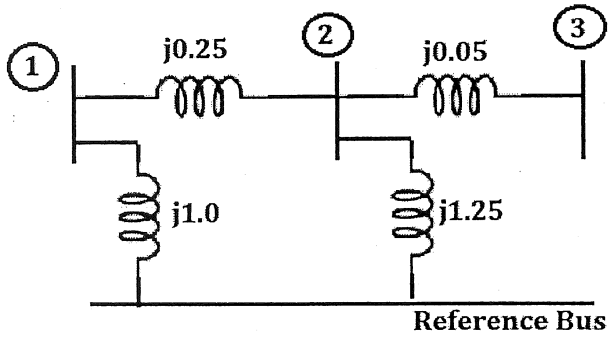
(b) Obtain Y_{br}, Y_{loop} by non-singular transformation method.

SECTION – II

3 (a) Derive the necessary expressions for the building up of Z-bus when i) new element is added. ii) new element is added between two existing buses. Assume mutual coupling between the added element and the elements in the partial network.

(b) What are the advantages of Z-bus building algorithm?

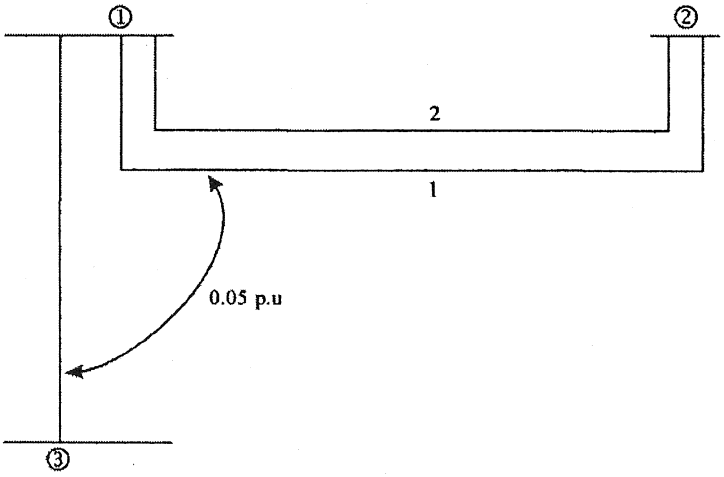
4 Construct the bus impedance matrix for the system whose reactance diagram is shown in the fig. below using building algorithm. All impedances are in p.u.



SECTION – III

5 Develop the necessary expression for building up algorithm of a three phase bus impedance matrix when the added element is a link.

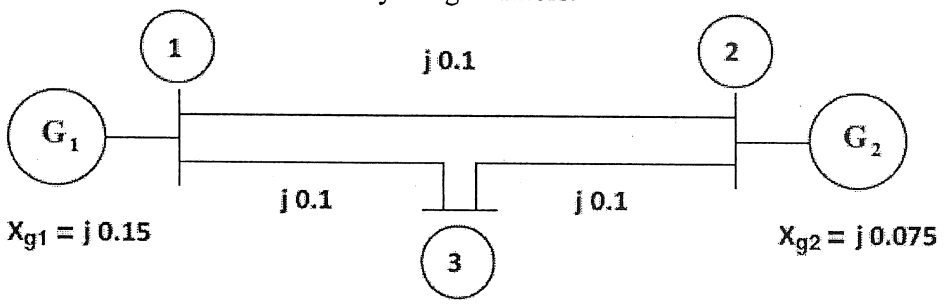
6 The double circuit line in the fig is further extended by the addition of a transmission line from bus (1). The new line by virtue of its proximity to the existing lines has a mutual impedance of 0.05p.u. and a self – impedance of 0.3 p.u. Obtain the bus impedance matrix by using the building algorithm.



SECTION – IV

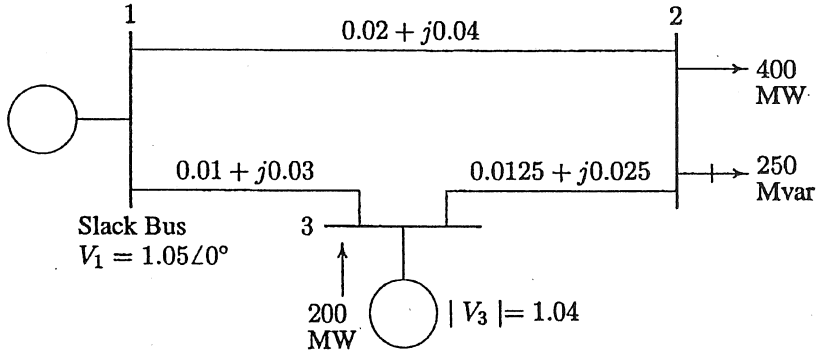
7 Derive the equations for the total fault current in terms of symmetrical components and phase quantities for the faults at bus-p for general system for the following cases: (i) Three phase (not grounded) (ii) Line to line

8 Consider the power system shown in figure below. The p.u. impedances are on a base of 50 MVA and 12 kV. Symmetrical short circuit occurs at bus 3 with zero fault impedance. Using Z-bus matrix, determine the fault current, bus voltages and also the currents contributed by the generators.



SECTION – V

9 The single line diagram of a simple power system with generators at buses 1 and 3 as shown in figure below. The magnitude of voltage at bus 1 is 1.05 p.u. and voltage magnitude at bus 3 is fixed at 1.04 p.u. with active power generation of 200MW. A load consisting of 400 MW and 250 MVAR is taken from bus 2. The line impedances are marked in p.u. on a 100 MVA base and the line charging susceptances are neglected. Obtain the power flow solution using Fast Decoupled method after first iteration.



10 (a) Distinguish between Gauss-Siedel & Newton Raphson Power flow methods.

(b) List the assumptions made in the Decoupled and Fast Decoupled load flow methods.

Code : 17PS1102

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

HVDC & FACTS

(Power Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1 a) Explain the comparison of AC and DC transmission in detail.

b) State the advantages and disadvantages of dc transmission system with following economics, reliability, performance.

2 a) Explain the application of dc transmission.

b) Draw the schematic circuit diagram of a 6 pulse gratez's circuit and explain its principle of operation.

SECTION - II

3 a) For a fixed power transmission explain how the economic choice of voltage level selected in dc transmission system.

b) Explain the analysis of two and three valve conduction mode.

4 Discuss the principals of DC link control and Give the basic and modified converter control characteristics.

SECTION - III

5 a) Explain the Reactive power requirements in steady state

b) Draw the current controlled characteristics of Tyrister controlled reactor.

6 Discuss the design of AC filters and High pass filters

SECTION - IV

7 a) Classify the different types of FACTS controllers and Explain the relative importance of different types of controllers.

b) Discuss the relative importance of controllable parameters in power flow control.

8 Enumerate the operating features of STATCOM and compare STATCOM with SVC?

SECTION - V

9 Discuss various impedance type series compensators.

10 Write the comparison between IPFC and UPFC.

Code : 17PS1103

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

POWER SYSTEM OPERATION & CONTROL

(Power Systems)

Time : 3 hours Max. Marks: 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

SECTION – I

1. Two generating stations A and B have full load capacities of 500MW and 210MW respectively. The inter connector connecting the two stations has an induction motor / synchronous generator (plant C) of full load capacity 50MW near station A. Percentage changes of speeds of A, B and C are 5, 4 and 2.5 respectively. The loads on bus bars A and B are 250MW and 100MW respectively. Determine the load taken by the set C and indicate the direction of power flow.

2. (a) Briefly Explain static uncontrolled two-area system and control strategy of multi area system.

   (b) Explain dynamic response of state variable model of two -area system.

SECTION – II

3. (a) The line currents in a 3 phase supply to an un balanced load are respectively as $Ia = 10 + j20$; $Ib = 12 - j10$; $Ic = -3 - j5$ Amp. phase sequence is abc. Determine the sequence components of currents.

   (b) 3-phase, 25 MVA, 11 KV, alternator with X_0=0.05 p.u, X_1=X_2=0.15 p.u is earthed through a reactance of 0.333 ohms. Calculate the fault current for a single line to ground fault. Derive the formulae employed.

4. (a) What is Positive, Negative and Zero sequence components and explain its significance.

   (b) Derive the equation for fault current and line to line voltages during single line to line fault using symmetrical components.

SECTION – III

5. (a) Describe transient stability. Assume a classical generator model and consider the response of the system to a three-phase fault on transmission circuit and explain the transient stability phenomenon with illustrations.

   (b) Describe the factors influencing the transient stability and dynamic stability

6. (a) A power deficient area receives 50 MW over a tie line from another area. The maximum steady state capacity of the tie line is 100 MW. Find the allowable sudden load that can be switched on without loss of stability.

   (b) Explain equal area criterion for finding stability analysis.

SECTION – IV

7. (a) Write the expression for hourly loss of economy resulting from error in incremental cost representation.

   (b) 100MW, 150MW and 280MW are the ratings of three units located in a thermal power station. Their respective incremental costs are given by the following equations:

   $$\frac{dC_1}{dP_{G1}} = 0.15P_{G1} + 12 \qquad \frac{dC_2}{dP_{G2}} = 0.05P_{G1} + 14 \qquad \frac{dC_3}{dP_{G3}} = 0.21P_{G3} + 13$$

   Where P_{G1}, P_{G2}, P_{G3} are the loads in MW .Determine the economical load allocation between the three units, when the total load on the station is 300MW.

8. (a) Explain Quadratic programming method for economic dispatch.

   (b) Explain linear programming method for economic dispatch.

SECTION – V

9. (a) Explain optimum generation scheduling by considering transmission loss formula for two bus system.

   (b) A power system consists of two 100MW units whose input cost data are represented by equations below :

   $C_1 = 0.04\ P_1^2 + 22P_1 + 800$ Rupees/hour

   $C_2 = 0.045\ P_2^2 + 15P_2 + 1000$ Rupees/hour

   If total received power $P_R = 150$Mw.Determine the load sharing between units for most economic operation.

10. (a) Explain short term hydro thermal scheduling.

    (b) Explain the problem of scheduling Hydro power plants. What are the constraints in the problem.

Code :17PS1104

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

POWER QUALITY
(Power Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1 (a) List and explain the power quality standards.

(b) Give the causes of long interruptions.

2 (a) Discuss about the CBEMA and ITI curves.

(b) Compare Observation and Reliability evaluation.

SECTION - II

3 Explain about the monitoring methods of short interruptions.

4 Explain about single phase tripping

SECTION - III

5 Explain the sags due to starting of induction motors.

6 (a) Describe voltage sag and voltage duration.

(b) Describe how the voltage sag duration can be measured.

SECTION - IV

7 Explain the process of estimation of Computer Voltage Tolerance.

8 Describe the Mitigation methods of voltage sags for DC drives.

SECTION - V

9 (a) Describe the compatibility between equipment and supply.

(b) Explain the method of fault positions.

10 Explain about the power quality monitoring methods in detail.

Code : 17PS11E1

M.TECH. DEGREE EXAMINATION, JANUARY 2019
M.Tech. I Semester

ELECTRICAL DISTRIBUTION SYSTEMS
(Power Systems)

Time : 3 hours Max. Marks: 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1 a) Define the terms
i) Demand factor ii) Diversity factor,
iii) Load factor iv) Max Demand

b) What is the classification of loads and explain their respective load factors?

2 a) What are the various characteristics of a load modeling?

b) Derive the relationship between loss factor & load factor.

SECTION - II

3 a) Explain the primary feeder voltage levels.

b) What are the best site selection for a substation?

4 a) What are design consideration of a secondary distribution system?

b) What are the methods to analyze distribution feeder losses?

SECTION - III

5 a) Describe the three phase balanced primary lines.

b) Derive the equations for voltage drop and power loss for uniformly distributed load.

6 a) Deduce the equations for voltage drop equations for Non uniformly distributed load.

b) What are the various Non 3 phase primary lines and their relationship?

SECTION - IV

7 a) What are the various types of common faults and procedure for fault calculation?

b) What are the various types of objectives of protection?

8 a) What is the need of coordination of protective devises?

b) Explain Fux to Fuse and Fuse to C.B. coordination.

SECTION - V

9 a) What are the measures taken for line drop compensation?

b) What is reactive power? How a capacitive compensation is done for power factor control?

10 a) What is the need of power factor correction? And explain the effect of series capacitor.

b) Explain the best capacitor location.

Code :17EC1105

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

TRANSFORM TECHNIQUES

(Digital Electronics & Communication Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1. (a) Find the z-transform of the function

$$x(n) = \begin{cases} n3^n & for\ n > 0 \\ \frac{2^n}{n} & for\ n < 0 \end{cases}$$

(b) Compute the DCT matrix for N=4.

2. (a) Find the DTFT of the sequence a) $x(n) = (\frac{1}{2})^{|n-1|}$ b) $x(n) = \left(\frac{1}{4}\right)^{n-2} u(n)$

(b) Write any four properties of Hotelling Transform.

SECTION - II

3. (a) Differentiate between continuous and discrete wavelet transforms.

(b) Show that Mexican wavelet does not satisfy the admissibility condition

4. (a) Explain about MRA?

(b) Show that $|\emptyset(w)|^2 = \sum_{k=1}^{\infty} |\Psi(2^k w)|^2$

SECTION - III

5. If X(w) is Fourier transform of x(n). Show that the Fourier transform of down sampled version x(2n) is $\left[X\left(\frac{w}{2}\right) + X\left(\frac{w}{2} + \pi\right)\right]/2$.

6. (a) Explain about two channel filter bank?

(b) Consider a two channel QMF bank with the analysis and synthesis filters given by

$H_0(z) = 2+6z^{-1}+z^{-2}+5z^{-3}+z^{-5}$; $H_1(z) = H_0(-z)$; $G_0(z) = H_0(z)$; $G_1(z) = -H_1(z)$

(i) Is the QMF filter bank alias free?

(ii) Is the QMF filter bank a perfect reconstruction system?

SECTION - IV

7. With the help of relevant expression and block diagram explain
   a) Octave-band filter bank b) Tree structured filter bank.

8. (a) Explain about Bi-orthogonal wavelets.

   (b) Explain about multi Wavelets

SECTION - V

9. (a) a) Explain about sub-band coding of speech signal.

   (b) Explain signal denoising using wavelet transform.

10. Explain about JPEG2000 image compression

CODE: 17EC1104

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. First Semester

CODING THEORY & TECHNIQUES

(Digital Electronics and Communication Systems)

Time: 3 hours Max. Marks: 60

*Answer FIVE Questions, Choosing **ONE** Question from each section*

All Questions carry equal marks

* * *

SECTION - I

1. (a) Define Information, Entropy, Information rate.
Prove that H(X, Y) = H(X) + H(Y/X)

(b) Consider two messages S_1 and S_2 emits messages X_1, X_2, X_3 and Y_1, Y_2, Y_3. Calculate H(X), H(Y), H(X/Y), and H (Y/X)

$$P(X, Y) = \begin{bmatrix} \frac{3}{40} & \frac{1}{40} & \frac{1}{40} \\ \frac{1}{20} & \frac{3}{20} & \frac{1}{20} \\ \frac{1}{8} & \frac{1}{8} & \frac{1}{8} \end{bmatrix}$$

2. (a) State and explain Shannon-Fano algorithm.

(b) A transmitter generates messages $m_1, m_2, m_3, m_4, m_5, m_6, m_7, m_8$ with their probabilities are 1/4,1/8,1/16,1/16,1/16,1/4,1/16,1/8. Find the coding efficiency using Shannon-Fanocoding.

SECTION - II

3. Consider (7, 4) Linear block code whose parity check matrix is given by

$$\begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$

(i) Find the generator matrix of this code.
(ii) Find all the code words.
(iii) Find the minimum weight of this code.
(iv) Find how many errors are detected? How many errors are corrected?

4. Explain the following:
(a) Mathematical description of linear block codes.

(b) Error Detecting and Correcting capabilities of linear block code.

SECTION - III

5. Briefly explain the following:
(i) Hamming codes (ii) Perfect codes
(iii) Weight Enumerators (iv) Mac Williams theorem

6. Based on the Mac-Williams identity, the weight enumerated B(z) of the dual code C_D is expressed in terms of the weighted enumerator A(z) of the code C by

$$B(z) = 2^k(1+z)^n A\left(\frac{1-z}{1+z}\right)$$. Derive A (z) in terms of B (z)

SECTION - IV

7. (a) The generator polynomial for a (15, 7) binary cyclic code is $g(x) = 1+x^4+x^6+x^7+x^8$ Find the Code vector in Systematic form and Non-systematic form for the message polynomial $D(x) = x^2+x^3+x^4$.

(b) Assume that the first and last bits of the code vector for $D(x) = x^2+x^3+x^4$ suffer transmission errors. Find the syndrome of V(x).

8. (a) Explain the State diagram, Trellis diagram &Code tree in convolution codes.

(b) Explain about the Maximum Likelihood Decoding of Convolution Codes.

SECTION - V

9. (a) List and elaborate the basic properties of Galois Fields.

(b) Explain the decoding procedure for BCH codes.

10. (a) Explain the Stack Sequential decoding algorithm with the help of flow chart.

(b) Explain the applications of viterbi decoding and sequential decoding.

CODE : 17EC1103

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. 1 Semester

EMBEDDED SYSTEM CONCEPTS

(Digital Electronics and Communication Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1 Describe in detail about embedded system on-chip with necessary sketch.

2 Discuss about the factors to be considered for selection of processor in embedded system.

SECTION - II

3 Explain about the IEEE488 bus serial interface with neat sketches?

4 a. Illustrate the debugging technique in embedded systems.

b. Which is the best suited way for building embedded software into target system?

SECTION - III

5 a. Explain message queue with an example.

b. Explain interrupt service mechanism. How priority interrupts can be handled?

6 a. Discuss about the various functions in semaphore.

b. Explain pipe management function calls.

SECTION - IV

7 Explain about locators in an embedded system.

8 What are the design methodologies? Explain in detail about design flow techniques.

SECTION - V

9 a. Explain the following:

(i) Telephone PBX.

(ii) Inkjet printers.

b. Discuss the instruction set available in the ARM processor.

10 a. Explain how the hardware testing is perform in embedded system using long analyzer.

b. Differentiate ARM and SHARC processor.

CODE : 17EC1101

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. First Semester

DIGITAL SYSTEM DESIGN
(Digital Electronics and Communication Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION – I

1. (a) Realize F1 and F2 using PLA. Give the PLA table and internal connection diagram for the PLA.

F1(a,b,c,d)=_m(1,2,4,5,6,8,10,12,14)
F2(a,b,c,d)= _m(2,4,6,10,11,12,14,15)

(b) Explain the difference between PLA and PAL with advantages of both.

2. (a) Obtain the minimal expression using the tabular method and implement it in universal logic. F = m (0, 1, 3, 4, 5, 7, 10, 13, 14, 15)

(b) Draw an ASM chart to design control logic of a binary multiplier. Realize the same using MUX, decoder and D-type flip flops.

SECTION – II

3. (a) Implement a BCD to Excess-3 code converter by ROM. Calculate the cross point density of the implementation.

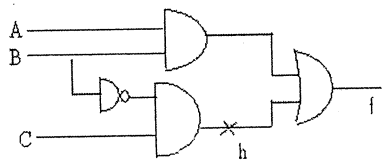
(b) Write a short note on DFT schemes?

4. (a) Design a combinational circuit using a ROM. The circuit accepts a 3 bit number and generates an output binary number equal to the square of the input number.

(b) How a sequential circuit can be designed using FPGA?

SECTION – III

5. (a) Apply D-algorithm to detect h SAO fault in the given circuit and derive the test vectors.



(b) Describe the algorithmic steps involved in PODEM.

6. (a) Explain the terms
(i) fault diagnosis (ii)fault detection (iii)test generation

SECTION – IV

7. (a) Explain the procedure how to find fault detection and location in sequential circuits

   (b) Give the detailed procedure of circuit test approach of sequential circuits.

8. (a) Determine the distinguishing sequence for the following machine M by Conducting Adaptive Distinguishing experiment.

PS	NS, Z	
	X=0	X=1
A	C,0	A,1
B	D,0	C,1
C	B,1	D,1
D	C,1	A,0

   (b) Define a diagnosable sequential machine and how it can be constructed.

SECTION – V

9. (a) Explain how to test a PLA circuits?

   (b) Explain the following with examples:
   (i) flow table (ii) state reduction.

10. (a) Explain briefly, the occurrence of various types of hazards in digital circuits.

   (b) Explain the following with examples:
   (i) Minimal closed covers (ii) Races and Hazards.

Code: 17EC1102

M.TECH. DEGREE EXAMINATION, JANUARY 2019
M.Tech. I Semester

ADVANCED DIGITAL SIGNAL PROCESSING
(Digital Electronics and Communication Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION-I

1 (a) Define DTFT of a sequence? How magnitude and phase spectrum can be obtained? Explain.
(b) Apply DTFT on $x(n)= (1/2)^n u(n)$ and obtain $X(e^{jw})$, magnitude and phase of $X(e^{jw})$.
2 (a) Discuss about the Energy Spectral Density of a discrete time signal.
(b) Evaluate ESD of a sequence $x(n)= (1/2)^n u(n)$.

SECTION-II

3 (a) Explain about Inverse System with an example.
(b) Find the input x(n) of a LSI system having response y(n)={1,5,10,11,8,4,1} and impulse response h(n)={1,2,1}
4 (a) How to examine the discrete LSI system for stability using algebraic stability test.
(b) Analyze the system y(n)-ay(n-1)=x(n) for stability.

SECTION-III

5 (a) How to design IIR filters using pades approximation? Explain
(b) Compare IIR tapped cascade lattice structures with FIR cascaded lattice structures
6 (a) Where the tunable IIR digital filters are used? Explain
(b) Explain about the poly phase structures

SECTION-IV

7 (a) What is meant by sliding DFT? Explain.
(b) Evaluate DFT of a sequence x(n)={1,0,-1,0,1,0,-1,0} using FFT algorithm.
8 (a) What is split radix FFT? Explain.
(b) Explain about DFT computation over a narrow frequency band.

SECTION-V

9 How to estimate power spectrum by using Welch non-parametric method? Explain.

10 How to estimate power spectrum by using Yule-Waker & Burg parametric method? Explain.

CODE : 17EC11E2

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. First Semester

LOW POWER VLSI DESIGN

(Digital Electronics and Communication Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1 (a) Explain about the design limitations imposed on low-power, low voltage circuits.
(b) Draw and explain high performance high cost BiCMOS process

2 What is isolation, What is the need of isolation & explain what are the isolation techniques used in MOS transistors and explain one in detail.

SECTION - II

3 (a) Interpret the Transfer characteristics of CMOS inverter.
(b) List out the sources of power consumptions in CMOS circuits

4 (a) An NMOS transistor is operating in saturation region with the following parameters VGS=5V, Vtn =1V, (W/L) =10, μncox=110μA/V2. Find Drain resistance of the device.
(b) Outline the leakage power reduction in ICs

SECTION - III

5 Draw the circuit diagram & explain the operation of CMOS & BiCMOS NAND logic gate

6 (a) Compare the various advanced BiCMOS circuits
(b) Draw the circuit for conventional BiCMOS two-input AND gate and describe its operation

SECTION - IV

7 (a) Formulate the generate carry and propagate carry of Carry look ahead adder
(b) Write the drawbacks of ripple carry adder circuits

8 (a) Explain the low voltage, low power Transmission gate logic
(b) Compare the various low power adders circuits.

SECTION - V

9 (a) Construct Braun Multiplier and explain its operation
(b) What are the building blocks are needed for binary array multiplier and explain

10 (a) Design a 8X3 ROM and explain its operation
(b) Interpret the timing waveforms of Synchronous RAM

Code : 17MME102

M.TECH. DEGREE EXAMINATION, JANUARY 2019
M.Tech. I Semester

ADVANCED MATERIALS TECHNOLOGY
(Advanced Manufacturing Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1 (a) Explain the mechanism of plastic deformation.

(b) What is Hall-petch relationship in grain boundary strengthening?

2 (a) Discuss solid solution strengthening technique.

(b) Explain screw dislocation and edge dislocation.

SECTION - II

3 (a) Explain Griffiths theory applied to brittle materials.

(b) Explain different high temperature fracture mechanism maps.

4 (a) Explain different modes of high temperature fracture.

(b) Explain stress intensity factor and fracture toughness.

SECTION - III

5 (a) Discuss crack initiation and propagation mechanism in fatigue.

(b) Explain S-N curve and endurance limit.

6 (a) Describe the major factors which affect the fatigue strength of a metal.

(b) Explain crack growth laws.

SECTION - IV

7 (a) Explain creep and fatigue. What are the factors that affect them?

(b) How materials are selected for corrosion and wear resistance?

8 What are the various mechanical and metallurgical properties to be considered for the selection of

(i) Gears (ii) Axles (iii) Pressure vessels (iv) Machine beds

SECTION - V

9 Write short notes on

(i) Smart materials (ii) Shape memory alloys

(iii) Super alloys (iv) HSLA steel

10 What are advanced structural ceramics? State different fabrication methods used for ceramics and discuss any one of them.

CODE : 17MME101

M.TECH. DEGREE EXAMINATION, JANUARY 2019
M.Tech. I Semester
AUTOMATION IN MANUFACTURING
(Advanced Manufacturing Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION I

1. Compare fixed, flexible and Programmable automation. Discuss merits, demerits, and suitability Explain about Automation strategies?

2. (a) Explain about Automation strategies?

   (b) Answer the following :
   (i) Manufacturing lead time. (ii) Production rate and plant capacity

SECTION II

3. (a) .Discuss various types of materials handling systems. discuss guidelines of good handling system.

   (b) What are the features of A S/R S systems? And discuss its feasibility, advantages.

4. How the optimum line balancing is done in Killbridge and Westers method?

SECTION III

5. What are advantages of cellular manufacturing?

6. Discuss the concept of group technology? How part family codes are obtained?

SECTION IV

7. Discuss about Flexible Manufacturing systems and its components.

8. (a) Discuss the rules of scheduling in FMS.

   (b) Elucadate the importance of cellular manufacturing in modern manufacturing

SECTION V

9. (a) Explain concept of concurrent engineering ?

   (b) Explain computer aided process planning ?

10. (a) Explain the methods of shop floor control?

    (b) Write inspection principles and strategies in quality control?

Code : 17MME103

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

ADVANCED MANUFACTURING PROCESSES
(Advanced Manufacturing Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1 Explain the principle, mechanics of metal removal, process parameters, advantages, disadvantages and applications of Ultrasonic machining (USM) with neat sketch.

2 (a) Differentiate traditional machining and nontraditional machining.

(b) Explain the differences between Abrasive Jet Machining (AJM) and Water Jet Machining (WJM).

SECTION - II

3 Explain the principle, process parameters, advantages, disadvantages and applications of Wire EDM with neat sketch.

4 Explain the principle, process parameters, advantages, disadvantages and applications of Electro Chemical Machining (ECM) with a neat sketch.

SECTION - III

5 Explain the principle, process parameters, advantages, disadvantages and applications of Laser Beam Machining (LBM) with neat sketch.

6 Explain the principle, process parameters, advantages, disadvantages and applications of Plasma Arc Machining (PAM) with neat sketch.

SECTION - IV

7 (a) Describe various micro system products, devices and applications.

(b) Write a short note on soft lithography.

8 List various nano technology products and describe carbon nano structures.

SECTION - V

9 (a) Describe the classification, characteristics and applications of ceramics.

(b) Write short note on metal matrix composites.

10 (a) Write a short note on powder preparation in ceramics.

(b) Explain the method of processing FRCs.

Code : 17MME104

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

DESIGN FOR MANUFACTURING AND ASSEMBLY

(Advanced Manufacturing Systems)

Time : 3 hours | Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1 a Draw the schematic diagram of the basic elements of a design process and explain them briefly.

b what are the steps involved in Design process

2 a Explain about material technology and what are the design developments in Material technology.

b Explain material selection interrelation ship with process selection.

SECTION – II

3 a What is Machinability, Explain the selection of machining parameters.

b What is Metal casting, Explain various casting process.

4 a Derive the expression of optimum cutting speed for minimum cost.

b What are general selection of casting process.

SECTION – III

5 a What is welding, Explain various welding process.

b Explain effects of thermal stresses in weld joints.

6 a What are design factors for punching and blanking

b With a neat sketch explain design of closed die forging design and drop forging die design?

SECTION – IV

7 a What is meant by Automatic Assembly Transfer system

b What is meant by paced free. explain

8.a. What is meant by choice of assembly method

b. What is meant by transfer machine, Explain the working and advantages?

SECTION - V

9.a Describe the classification of manual handling, manual insertion and fastering .

b) Design for assembly fits in design process.

10. a) Explain effect of part thickness and size on handling time.

b) Explain DfA index.

Code : 17MME105

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

OPTIMIZATION TECHNIQUES IN ENGINEERING

(Advanced Manufacturing Systems)

Time : 3 hours Max. Marks : 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION – I

1 a) Write the general statement of an Optimization problem. Write some Engineering applications of optimization.

b) A fair coin is flipped 3 successive times. You receive Rs.100/- for each head (H) that turns up and an additional Rs.25/- for each two successive heads that appear (remember that HHH includes two sets of HH). However, you give back Rs.110/- for each tail (T) that shows up. You have the options to either play or not play the game. Draw the decision tree for the game. Would you favour playing this game?

2 What are the different criteria to handle a decision problem under uncertainty? Explain them with an example.

SECTION – II

3 Solve the following LPP by the method of duality:

Minimize: $Z = 5x_1 + 2x_2$

Subject to : $x_1 - x_2 \geq 3$

$2x_1 + 3x_2 \geq 5$

and $x_1, x_2 \geq 0$

4 Solve by revised Simplex method:

Minimize: $Z = 3x_1 + 2x_2$

Subject to : $3x_1 + x_2 \geq 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + x_2 \leq 3$

and $x_1, x_2 \geq 0$

SECTION – III

5 Use the Kuhn-Tucker conditions to solve the following non-linear programming problem:

Maximize: $Z = (x_1 - 1)^2 + (x_2 - 5)^2$

Subject to: $-x_1^2 + x_2 \leq 4$

$-(x_1 - 2)^2 + x_2 \leq 3$

6 Find the value of x in the interval (1,5) which minimizes the function $f = x^2 + 54 / x$

by (a) Dichotomous search method, and (b) Golden section method.

SECTION – IV

7 Solve the following ILP:

Maximize $Z = 4x_1 + 8x_2$

Subject to: $4x_1 + 5x_2 \leq 40$

$x_1 + 2x_2 \leq 12$

$x_1, x_2 \geq 0$ and integer.

8 Solve the following binary integer programming problem using exhaustive enumerative method:

Maximize $f = -10x_1 - 5x_2 - 3x_3$

Subject to: $x_1 + 2x_2 + x_3 \geq 4$

$2x_1 + x_2 + x_3 \leq 6$

$x_i = 0$ or 1, i = 1,2,3.

SECTION – V

9 Explain the two shortest – route algorithms.

10 Use Dynamic Programming approach to solve the following LPP:

Maximize $Z = 8x_1 + 7x_2$

Subject to: $2x_1 + x_2 \leq 8$

$5x_1 + 2x_2 \leq 15$

and $x_1, x_2 \geq 0$

Code : 17MME1E4

M.TECH. DEGREE EXAMINATION, JANUARY 2019

M.Tech. I Semester

ADVANCED CASTING AND WELDING TECHNIQUES
(Advanced Manufacturing Systems)

Time : 3 hours Max. Marks :60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks
* * *

SECTION - I

1. (a) Two castings are moulded in green sand. They differ in weight by a factor of 3.8. both are cubes. If lighter casting solidifies in 8.7 minutes, how much time would you estimate for a larger casting to solidify.

   (b) Explain the effect of parameters influencing in the solidification of metal casting.

2 Which of the following consideration is important for a riser to function properly? Must it.
   a) Have a surface area larger than the part being cast
   b) Be kept open to atmospheric pressure, and/or
   c) Solidify fast? Why? Explain.

SECTION - II

3 Although sand casting is the most widely used process judging from the tonnage of castings produced, there are instances where one would choose die casting in preference to the sand casting. Discuss the statement with suitable example.

4 (a) State any four differences between investment casting and conventional casting.

   (b) Why large parts cannot be manufactured by centrifugal casting? Give Reasons.

SECTION - III

5 (a) The yield stress of a metal is 250 MPa. What is the maximum possible residual stress in that metal if it is welded?

   (b) Name any four welding defects, their causes and remedies.

6 (a) With a sketch, describe the metallurgical transformations that take place in a heat affected zone of a welded joint.

   (b) What are the techniques available for testing of weldment?

SECTION – IV

7 (a) Explain the Thermit Welding process with neat sketch. Enumerate its applications.

(b) Explain the Explosive welding process with neat sketch. Write down its applications and limitations.

8 Write Short note on following.

a) Advantages of Laser beam welding
b) Applications of Explosive welding
c) Differences between friction welding and friction stir welding.

SECTION - V

9 (a) State significance of welding automation.

(b) Mention any four material handling equipment in foundry. Explain any one of them with neat sketch.

10 (a) Explain with a neat sketch the principle of full mould process.

(b) Briefly explain squeeze casting process.