

**QUESTIONS PAPERS
SUPPLEMENTARY EXAMINATION
SEPTEMBER- 2019**



**M.TECH (FT/PT)
II Sem (FT/PT) & IV Sem (PT)**

12/09/21

QUESTION PAPERS FOR M.TECH. II SEMESTER (FT&PT) & IV SEMESTER (PT) & Ph.D WORK SUPPLEMENTARY EXAMINATION, SEPTEMBER-2019

I N D E X

	Departments	Paper Code	II SEMESTER (FT/PT) & IV SEMESTER (PT)	
			Page No.	
1	Applied Chemistry (AC)	AC	-----	
2	Applied Mathematics(AM)	AM	-----	-----
3	Applied Physics (AP)	AP	-----	-----
4	Bio Technology (BT)	BT	-----	-----
5	Civil Engineering(CE)	CE	01 - 09	-----
6	Computer Science & Engg.(CO)	CO	10 - 16	-----
9	Electronics & Communication	EC	17 - 24	-----
8	Electrical Engineering(EE)	EE	-----	-----
10	Humanities (HU)	HU	-----	-----
7	Information Technology (IT)	IT	-----	-----
11	Mech. Engineering(ME)	ME	-----	-----
12	Software Engineering (SWT)	SWT	-----	-----

— 01 —

Total No. of Pages 1

Roll No.

SECOND SEMESTER

M.Tech. (Str. Engineering)

SUPPLEMENTARY EXAMINATION

SEPTEMBER - 2019

CE-6032 DESIGN OF TALL BUILDINGS

Time: 3:00 Hrs.

Max. Marks: 100

Note :

- Question No. 1 is compulsory and attempt any four from remaining questions.
- Assume suitable missing data, if any.

1. Write notes on the following:

- Sequential loading,
- Wind tunnel experimental method,
- Reduction techniques and
- Out of plumb effect.

(4 X 5 = 20)

2. Explain in detail Fibre Reinforced Concrete.

(20)

3. How would you estimate earthquake loading in the design of tall buildings.

(20)

4. Explain in detail Tubular Structural System along with its merits and demerits. How would you take care of its demerits?

(20)

5. Analyze 15th floor of a 20 storeyed three bay frame, which is under the influence of wind load. The intensity of wind load is 1.5 kN/m^2 throughout and distances between frames are 7m. Each storey height of the building is 3.5 m and distances between columns from left to right are 6.5m, 7.5m and 6.0m respectively.

(20)

6. Explain the procedure in detail, which you will adopt in the direct P- Δ analysis.

(20)

Total no. of pages: 2

— 0 2 —

Roll No.....

SECOND SEMESTER

M. Tech.[EN]

SUPPLEMENTARY EXAMINATION

SEP- 2019

CE-6122 INSTRUMENTATION

Time: 3:00 Hours

Max. Marks: 100

Note: Answer any five questions.

All questions carry equal marks. Drawn neat diagram wherever necessary. Assume suitable missing data, if any.

- 1 [A] Write down the advantages and disadvantages of orifice meter, venturimeter and nozzles. [8]
- [B] Write down the different measurement techniques based on signals. [12]
- 2 Write explanatory notes on : [2*10=20]
 - [A] Flue gas analyser.
 - [B] Electroanalytical methods.
- 3 Write down the principle, application and limitation of the following. [2*10=20]
 - [A] Spectrophotometer.
 - [B] NDIR.
- 4 Describe with neat sketch the principle, working, application and Limitation of total radiation pyrometer. [20]
- 5 Write informative notes on (any two): [2*10=20]
 - [A] Atomic absorption spectrophotometer.
 - [B] Fluorimeter.
 - [C] Nephelometer.

203-

6 Define the term Chromatography. With neat block diagram describe all the important unit of gas chromatography. Discuss the use of gas Chromatography in the field of Environment Engineering.

7 Write short notes on (any two):

[2*10=

[A] Turbidity meter.

[B] Flame ionization detector.

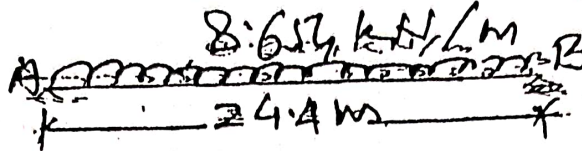
[C] Electromagnetic flow meter.

[D] Flame Photometer.

Q.4 Attempt any two of the following:

[2 x 10 = 20]

- (a) S/s pre-cast pre-tensioned single T beam span and the dead load are 24.4 m and 8.64 kN/m respectively. Compute short term and long-term camber of the beam shown below for the data as given.



Creep coe. $\phi = 2.4$

$E_c = 5000\sqrt{50} \text{ N/mm}^2$

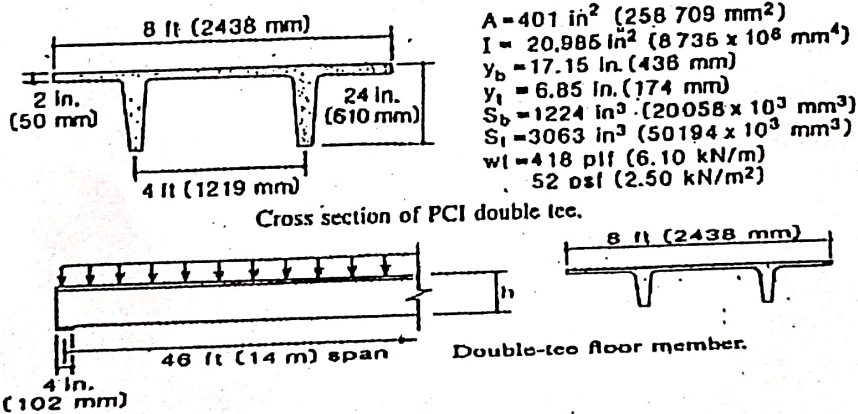
$I_{trans} = 30830 \times 10^6 \text{ mm}^4$

$I_{trans \text{ modified}} = 36450 \times 10^6 \text{ mm}^4$

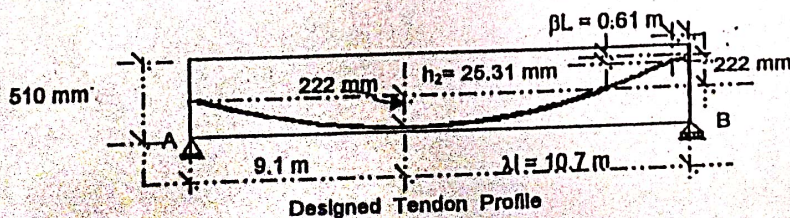
$M_0 = 847 \text{ kNm}$ short term response [N_0 and M_0 are the actions required to produce zero concrete strains]

$M_0 = 709 \text{ kNm}$ long term response.

- (b) The un-topped tee-floor beam shown in figure below, spans 14 m in an office building and carries a service live load of 2.5 kN/m^2 as well as a superimposed dead load of 0.5 kN/m^2 . The concrete strength at transfer f_{ck} 7 days is 31 MPa and the 28 days strength is 40 MPa. It is a normal weight concrete. The pre-stressing steel in the web is 6 nos. - 13 mm diameter 7 wire low relaxation strand, with an ultimate strength $f_{pu} = 1860 \text{ MPa}$, which is tensioned to $0.75 f_{pu}$ in the pre-stressing bed. Plot the maximum and minimum eccentricity line for the span taking ordinates at quarter span points, so that a suitable tendon profile may be selected for the condition that the tensile stress is permitted at top and at bottom.



- (c) The designed tendon profile for the left span AB is as shown in figure below for a two span continuous one way slab ABC having each span 19.8 m. The slab is to be post tensioned with bonded tendons, by 4 nos. 13 mm dia. 7 wire low relaxation strands with $f_{pu} = 1860 \text{ MPa}$. Every alternate tendon will be stressed from end A and end C shall be the dead end. Jacking stress to be applied is $0.75 f_{pu}$ and after anchoring it is $< 0.7 f_{pu}$. Take $\mu = 0.20$ and $k = 0.002$ per metre and assume anchorage set as 6 mm. Calculate the friction loss parameters. Plot the variation in tendon force and stresses because of short term losses due to anchorage slip, curvature and wobbling friction losses. Also estimate the long-term average stress in the tendons.

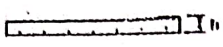
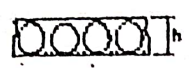
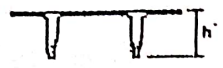
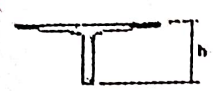


Q.5

The one-way floor slab is post tensioned with unbonded, low relaxation 15 mm dia 7 wire strands in a 19 mm diameter plastic sheath. The floor slab supports a specified live load of 2.5 kN/m^2 and a superimposed dead load of 0.5 kN/m^2 . The partition supported by the floor slab is likely to be damaged by large deflections. The slab shall be post tensioned when the concrete is 7 days old, with strength 27 MPa and the 28 days strength of the normal weight concrete is 35 MPa . Effective span of the slab is 10 m and the tendon profile is parabolic, with maximum eccentricity at the centre and zero at the ends w.r.t. c.g.c line. Design the floor slab as follows:

- (a) Determine depth, tendon profile, tendon spacing, and obtain estimation of stresses in the tendons considering tendon stress plan as alternate tendon stressed from one end. Take $k=0.002$ per m and $\mu = 0.17$. Jacking stress to be applied is $0.75 f_{pu}$ and after anchoring it is $\leq 0.7 f_{pu}$.
- (b) Check for concrete stresses at service loads for initial and final conditions at mid span.
- (c) Determine flexural strength at ultimate collapse load.
- (d) Check for maximum deflection for the condition specified as above.

[4 x 06 = 24]

Type of element	Live load (psi (kN/m ²))	Span/depth L/h ratio
	<dead load	40
	50 (2.4) 100 (4.0)	40-50 32-42
	50 (2.4) 100 (4.8)	20-30 18-20
	50 (2.4) 100 (4.8)	23-32 18-24

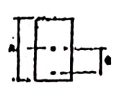
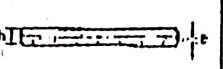

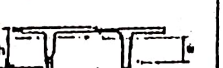

Typical span-to-depth ratios for simply supported prestressed concrete members.

Values of f_{yi} and f_{pi}

Strand Type $f_{ps} = 270$ ksi (1860 MPa)	$f_{p,red}$	f_{yi} ksi (MPa)	Long-Term Losses % (MPa)	f_{pi} ksi (MPa)
Stress-relieved	$0.7f_{ps}$	170 (1172)	35 (240)	135 (932)
Low-relaxation	$0.75f_{ps}$	187 (1290)	30 (210)	157 (1080)

Typical values of f_{yy}/f_{pu}

Tendon Type	f_{yy}/f_{pu}
Low relaxation strand	0.90
Stress-relieved strand	0.85
Plain precasting bars	0.85
Deformed prestressing bars	0.80

Cross section shape	$a = k_1$	$k_2 = k_D$
	0.50 h	0.33 h
	0.47 h	0.33 h
	0.50 h	0.49 h
	0.70 h	0.43 h
	0.76 h	0.49 h

Approximate values of flexural lever arms for preliminary service load design.

Common types from CPCI Metric Design Manual

Tendon Type	Grade f_{pu} MPa	Size Designation	Nominal Dimension		Mass kg/m
			Diameter mm	Area mm ²	
Seven-wire strand	1860	9	9.53	55	0.132
	1860	11	11.13	74	0.582
	1860	13	12.70	99	0.775
	1860	15	15.24	140	1.109
	1760	16	15.47	148	1.173

105

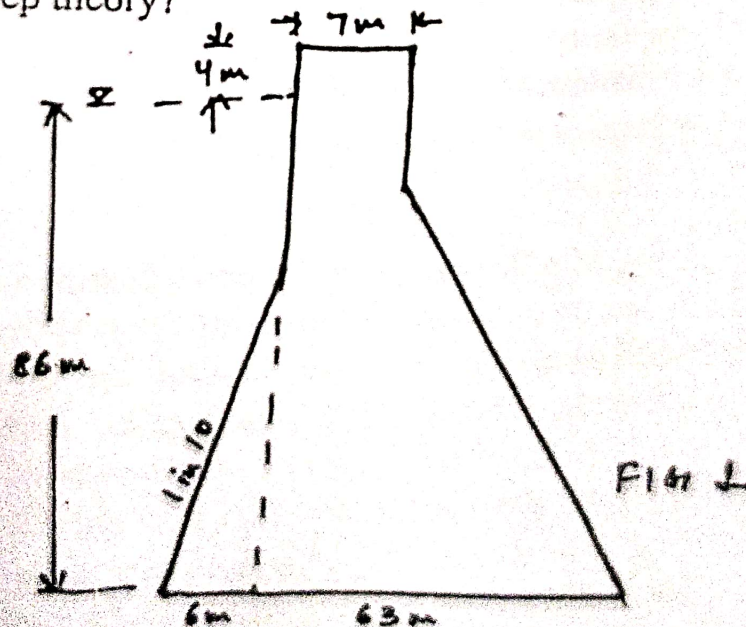
CE-6521 Design of Hydraulic Structures

Time: 3:00 Hours

Max. Marks: 100

Note: Answer any FIVE questions. Assume suitable missing data, if any.

- Q1 (i) Examine the stability of concrete gravity dam as shown in Fig 1 under the condition that reservoir are empty and earthquake forces rare acting downwards. The earthquake forces may be taken as $0.1g$ for horizontal forces and $0.05g$ for vertical forces. Take unit weight of concrete = 24kN/m^3 and unit weight of water = 10kN/m^3 . (15)
- (ii) How does Bligh's theory differ from Lane's Weighted Creep theory? (05)



- Q2 (i) Explain the Stream lines and Equipotential lines. (5)
- (ii) An earthen dam is made of a homogeneous material having the following data: (15)
- Coefficient of permeability if dam material = 5×10^{-4} cm/sec

Level of the top of the dam = 200m

Level of Deepest river bed = 178m

HFL of reservoir = 197.5m

Width of the top of the dam = 4.5m

Upstream slope = 3:1

Downstream slope = 2:1

Determine the phreatic line for this dam section without horizontal filter and discharge passing through the dam. Also explain the term phreatic line.

Q3

Answer any FOUR parts(5 marks each)

- (i) Explain the methods for the treatment of foundation of Gravity Dams. (5)
- (ii) What is the purpose of spillways and subsidiary spillways? (5)
- (iii) Explain the various classification of Dams (5)
- (iv) With suitable diagram explain the functioning of Straight drop Spillway. (5)
- (v) What are the criteria for selection of a suitable dam site? (5)

Q4

- (i) Explain the failure of one earthen dam and one gravity dam with suitable reasons and illustration. (10)
- (ii) Explain the term 'economic height of a Dam'? (5)
- (iii) What are the various forces acting on a gravity dam, Explain? (5)

Q5

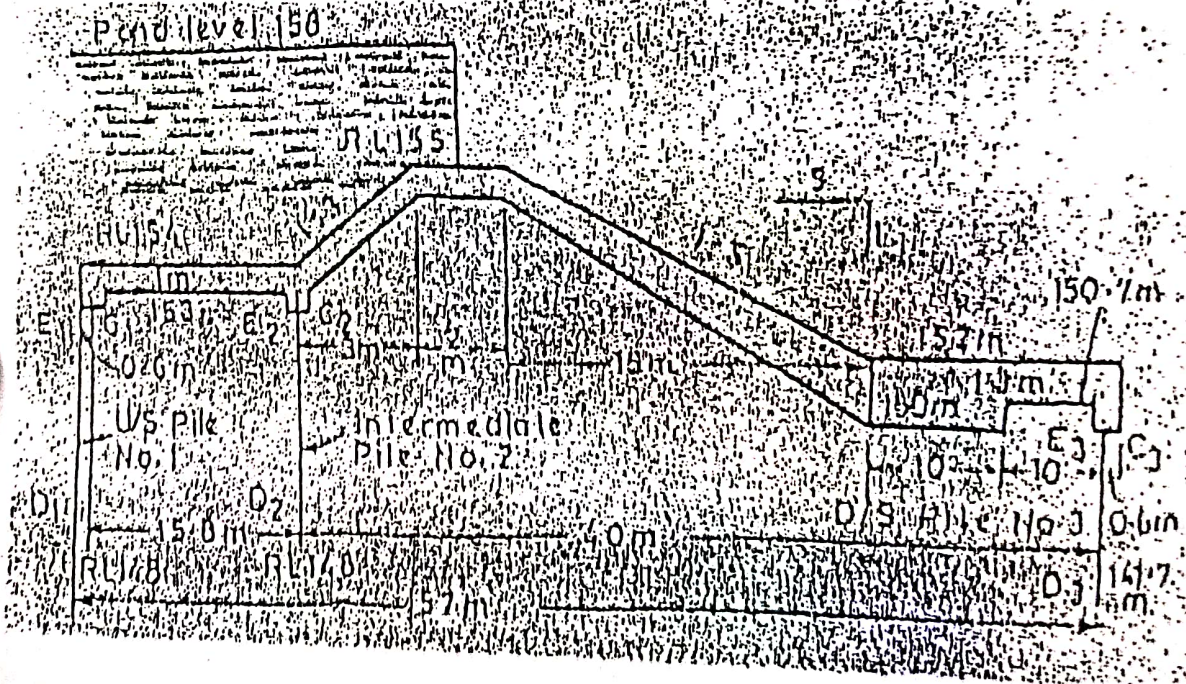
- (i) Explain the causes of failure of earthen dams? (8)
- (ii) Design a suitable section for the overflow portion of a concrete gravity dam having the downstream face sloping of 0.7H:1V. The design discharge for the spillway is 8000 cumecs. The height of spillway crest is kept at RL 204.0m. The average river bed level at the site is 100m. The spillway length consists of 6 spans having a clear width of 10m each. Thickness of each pier may be taken to be 2.5m (12)

Q6

- (i) What are rock-fill dams and what are its advantages over earthen dams. Draw a neat sketch showing the cross-section of a rock-fill dam (10)

(10)

(ii) Determine the percentage pressures analytically using formulas at various key points in the Weir as shown in Fig 2. Also, determine the exit gradient and plot the hydraulic gradient line for pond level on u/s and no flow on d/s.



Total No. of Page 2

Roll No.

Second Semester

M.Tech.

SUPPLEMENTARY EXAMINATION
September 2019

CE - 6611 Global Warming and Climate change

Time: 3 Hours

Maximum Marks: 100

Note: Attempt any 6 questions. Question No. 7 is compulsory. All questions carry equal marks.

- 80
1. Differentiate between local, regional and global environmental challenges. Write in detail about the occurrence of different clouds in the atmosphere. (15)
 2. Write the reactions in detail related to ozone formation and destruction along with its adverse health effects. Also throw some focus on the relationship between ozone hole and climate change. (15)
 3. What is Carbon Sequestration? Describe in detail the various techniques adopted during Carbon Capture and Storage. (15)

4. Does the green house effect occur naturally? How you will correlate the Smart Way and Smart Growth programme with GHG emission. (15)
5. What is CDM? Write the GWP of primary greenhouse gases along with reduction methods for different greenhouse gases in transport sector, industry sector and agriculture sector. (15)
6. What is boundary layer and Ozone hole? Explain the temperature profile of the atmosphere along with the presence of different gases in different layers of the atmosphere with neat and clean diagram only. (15)
7. Write Short Notes on any five: (25)
- (a) Good Ozone and Bad ozone
 - (b) CO₂ Flooding
 - (c) Climate Feedback
 - (d) Kyoto Protocol
 - (e) Acid Rain Reactions and Effects
 - (f) Smart City
 - (g) VAIP

THIRD SEMESTER
SUPPLEMENTARY EXAMINATION
CE-6622 SOLID WASTE MANAGEMENT

M.TECH. (ENE)
SEPT-2019

Time: 03 Hours

Max. Marks: 100

*Note: Attempt any five questions
Assume suitable missing data if any
All the questions carry equal marks*

1. Discuss the significance of following techniques in solid waste management
 - a) Incineration 10
 - b) Vermicomposting 10
2. a) A community of 20000 people generates MSW at a rate of 0.5 kg per person per day. The compacted unit weight of MSW in the collection truck is 500 kg/m³. If the capacity of collection truck is 15m³, how many truckloads of MSW, on average, will be unloaded at the landfill each year? 10
 - b) Discuss the working of a RDF plant in detail. 10
3. a) Briefly discuss the challenges associated with solid waste management in India. 10
 - b) With the help of a neat sketch explain the functions of the different components of sanitary landfill and its operation. 10
4. Write short notes on
 - a) Biogas 10
 - b) Gasification 10
5. a) Describe the significance of composting in waste management. Briefly explain the factors regulating composting: 10
 - b) What is the significance of reuse and recycling in waste management? Explain. 10
6. a) Define leachate. What are the environmental effects of leachate. How is the leachate managed at the sanitary landfills? Explain. 10
 - b) Briefly discuss the role of civic agencies in solid waste management. 10
7. MSW 'as delivered' has 65.1% of paper, food waste, yard trimmings, wood, and other decomposable matter. The moisture content of this waste is 35%. The elemental analysis of decomposable has following mass percentages:

Element	C	H	O	N	Other	Total
Dry Mass (%)	45.2	6.0	43.7	0.43	4.67	100

Find the chemical formula for the C, H, O, N portion of decomposable. Also find out the percentage of methane generated, per kilogram of waste. 20

Total no. of Pages: 02
Supplementary Examination
Second Semester

Paper Code: CO601 Information and Network Security
Duration: 3 Hrs.

Roll no:.....
Sept-2019
M.Tech.(CSE)
Max Marks: 100

NOTE: Attempt all the questions. Assume the missing data, if any.

- Q1. Answer the following questions in brief: (10x2=20)
- What is steganography?
 - List two transposition ciphers.
 - How many Ex-OR operations are used in DES cipher?
 - Define a state in AES. How many states are there in each version of AES?
 - What are the typical contents of Digital Certificate?
 - What is the role of a CA and a RA?
 - What is electronic money?
 - Discuss the algorithm for Auto key Cipher.
 - What is the utility of Digital Signature?
 - What are the benefits of remote access VPNs?

- Q2.a) Alice and Bob want to establish a secret key using the Diffie-Hellman key exchange protocol. Assuming the values as $n=11$, $g=5$, $x=2$ and $y=3$, find out the values of A, B and the secret key. (4)
- b) Use the Vigenere cipher with keyword "Network" to encipher the message "Introduction to computer security". Also list the drawbacks of this kind of cipher. (8)
- c) What is Demilitarized Zone? How is it implemented? (8)

- Q3. a) What are the problems associated with exchange of public keys? (4)
- b) Why is the SSL layer positioned between the application layer and the transport layer? (6)
- c) Why is SHA more secure than MD5? (10)

Q4. a) Describe the Triple Data Encryption Standard with two
DES Keys. (10)

b) Explain the architecture and working of Kerberos. (10)

Q5. Define the following terms (any four): (4x5=20)

- a) PGP
- b) Spoofing
- c) SET
- d) HMAC
- e) IDEA

END

Time: 3 Hours

Supplementary Exam Sept 2019

Paper code: CO-6022

Sem - II

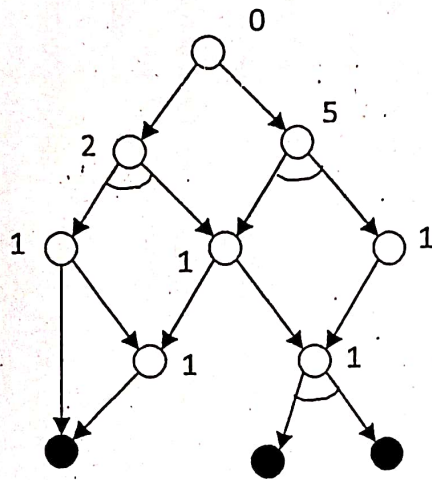
Max. Marks: 100

Note: Attempt any five Questions

1. (a) Would you use breadth-first or depth-first search for each of the following problems?
 - (i) Water jug problem
 - (ii) Theorem proving

4.
- (b) Explain the effect of overestimation and underestimation of the heuristic function in the A* algorithm.

6.
- (c) Solve the problem of the following using AO* algorithm (arc costs are unity)



Terminal nodes are darkened; h -values are shown by the side of the nodes. Show the search graph after every cycle of AO*.

- 10.
2. (a) Convert the following into a WFF and then its clause form:
Anything anyone eats and isn't killed by is food.

8.
 - (b) Define soundness and completeness of an inference rule. Prove that Resolution is Sound and Complete.

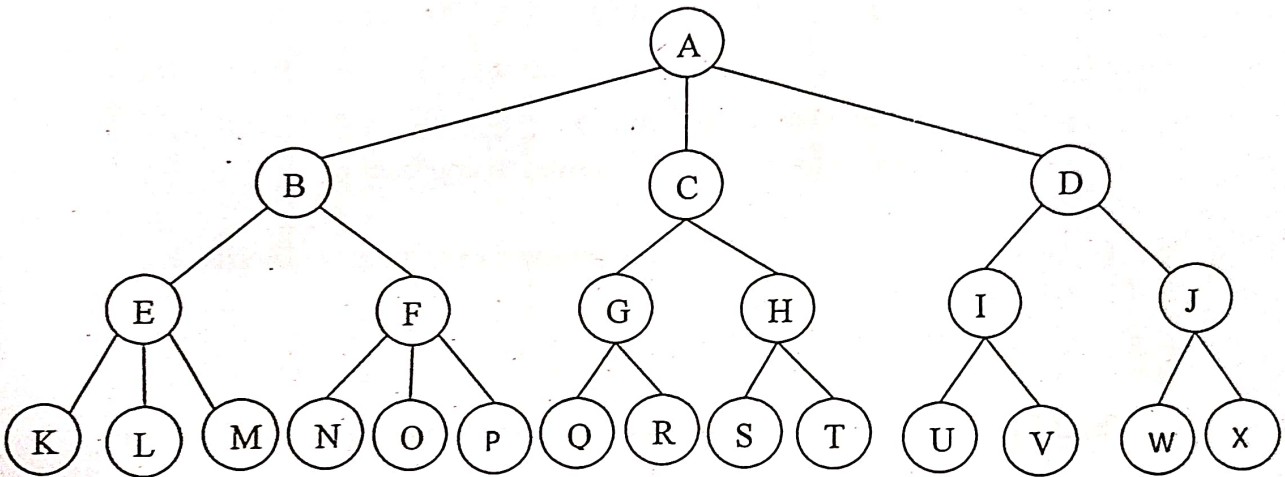
12.
 3. (a) Suppose that we are attempting to resolve the following clauses:
loves (father(a), a) and \sim loves (y, x) \vee loves (x, y)

- (i) What will be the result of the unification algorithm when applied to clause1 and the first term of clause2?
 (ii) What must be generated as a result of resolving these two clauses?

8.

- (b) Perform an alpha-beta prune of the following tree. Show the direction you are taking, the alpha and beta values at each appropriate place, and exactly where all pruning takes place. You are playing the top node and want to win. Heuristics at leaf nodes left to right are given below.

7 6 8 5 2 3 6 -2 0 2 5 8 9 2



12.

4. (a) Given the following rules in a "back-chaining" expert system application:

$$A \wedge \text{not}(B) \Rightarrow C \quad (\text{C.F.} = 0.9)$$

$$C \vee D \Rightarrow E \quad (\text{C.F.} = 0.75)$$

$$F \Rightarrow A \quad (\text{C.F.} = 0.6)$$

$$G \Rightarrow D \quad (\text{C.F.} = 0.8)$$

The system can include the following facts (with confidences):

$$F \quad (\text{C.F.} = 0.9)$$

$$B \quad (\text{C.F.} = -0.8)$$

$$G \quad (\text{C.F.} = 0.7)$$

Use the Stanford certainty factor algebra to determine E and its confidence.

10.

- (b) Consider the following fuzzy sets \tilde{A} and \tilde{B} :

$$\tilde{A} = \{(0, 1), (1, 0.9), (2, 0.8), (3, 0.7), (4, 0.6), (5, 0.5), (6, 0.4), (7, 0.3), (8, 0.2)\}$$

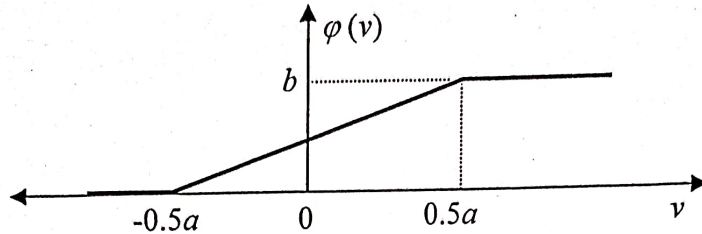
$$\tilde{B} = \{(2, 0), (3, 0.4), (5, 0.5), (6, 1), (10, 0)\}$$

Where the first number in each pair of parentheses denotes distance in cm. Find the value of $(C - D)^2$ at $x = 3$ cm, based on the relationships $C = \{A \text{ and } B\}$ and $D = \{A \text{ or } B\}$

10.

5. (a) Design a perceptron for AND function of two inputs. Define appropriate weights and bias in the range $[-1, 1]$ and use step activation function where if weighted sum is strictly greater than 0 then output 1 and if it is strictly less than 0 then output 0. 10.

- (b) Consider the pseudo linear activation function shown in the figure



- (i) Formulate $\varphi(v)$ as a function of v .
(ii) What happens to $\varphi(v)$ if a is allowed to approach 0. 10.
6. (a) Give two examples of each of the following and briefly describe each model
(i) Supervised Learning
(ii) Unsupervised Learning 12.

- (b) If R_1 and R_2 be two fuzzy relations $R_1: U$ to V and $R_2: V$ to W given by

$$R_1 = \begin{bmatrix} 0.3 & 0.8 & 0.4 \\ 0.6 & 0.9 & 0.1 \\ 0.2 & 0.5 & 0.6 \end{bmatrix} \text{ and } R_2 = \begin{bmatrix} 0.2 & 0.8 & 0.4 \\ 0.7 & 0.9 & 0.1 \\ 0.8 & 0.3 & 0.5 \end{bmatrix} \text{ find the composition relation } R_1 \circ R_2$$

7. (a) Discuss the architecture of Expert System and explain its components. 8.
12.
(b) Explain ATN for parsing. How is it different than RTN 8.

— END —

Total No. of Pages 2

Roll No... ..

II - SEM
END SEMESTER EXAMINATION

M.Tech.(CSE)
Sept- 2019

CO-6032 WIRELESS & MOBILE COMMUNICATION

Time: 3:00 Hours

Max. Marks: 100

Note: Answer all questions by selecting Any Two parts from each question.
Assume suitable missing data, if any.

Q.No. 1

2X10=20

- A) Explain GSM architecture and differentiate working of HLR & VLR. How Mobile call origination and Termination takes place in a cellular system? explain.
- B) Explain CSMA/CA with RTS/CTS mechanism and explain subfields of MAC frame format of IEEE 802.11.
- C) How foreign agent(FA) differ from home agent(HA)? explain packet delivery mechanism in mobile IP network, and illustrate agent discovery and registration mechanism.

Q.No. 2

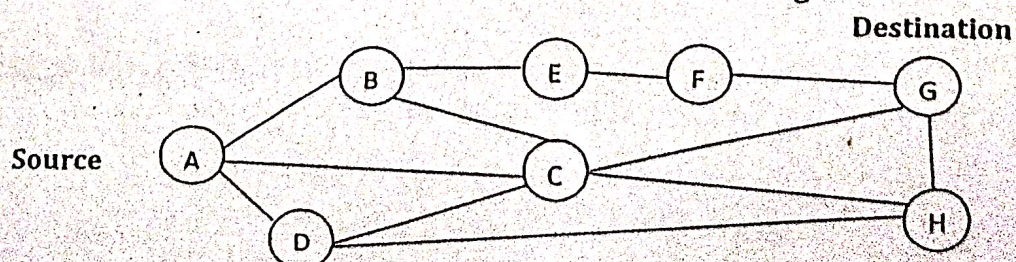
2X10=20

- A) A certain city has an area of 1300 square miles and is covered by a cellular system using a seven cell reuse pattern. Each cell has a radius of 4 miles and the city has 40 MHz spectrum with a full duplex channel bandwidth of 60KHz. Find:
(i) The number of cells in the service area.
(ii) The number of channels per cell.
(iii) Total number of subscribers that can be served.
- B) Explain working of PCF operation modes in context to WLAN and discuss physical layer convergence protocol (PLCP) in DSSS & FHSS mode.
- C) Explain Power management & synchronization mechanisms in wireless networks with suitable example.

Q.No. 3

2X10=20

- A) Explain the route creation and route maintenance using TORA assuming that at time t link fails between node C and node H. For following network.



- B) What is difference between traditional TCP and TCP over wireless? explain
- C) What is Bluetooth? Describe the general format of packet and packet header in Bluetooth technology. Differentiate between Piconet and Scatternet.

Q.No. 4

2X10=20

- A) What are the challenges of Mobile environment?. Explain wireless application protocol(WAP) architecture.
- B) What is difference between care of address (CoA) and co-located CoA? Describe encapsulation and tunnelling in Mobile IP.
- C) Explain working of DSDV and describe the Route discovery and Route maintenance mechanisms of Adhoc on demand Distance vector (AODV) Routing Algorithm.

Q.No. 5

2X10=20

- A) Explain the encryption mechanism used in wireless mobile environment.
- B) What is data replication? How it helps in mobile environment? How Data Management is done in this environment? Explain.
- C) Explain following
- Handoff between MSCs
 - Authentication & ciphering in GSM.

Total No. of Pages 02
SECOND SEMESTER

Roll No.
M.Tech. (SWE)

SUPPLEMENTARY EXAMINATION

SEPTEMBER-2019

CO-6134 REAL TIME SYSTEMS

Time: 3:00 Hours.

Max. Marks: 70

Note: Answer ALL questions. All questions carry equal marks.
Assume suitable missing data, if any.

1

- [a] Define the terms: Hard deadline, Relative deadline, Jitter . [3]
- [b] Explain Tracking in Detail with Gating and Data association. [4]
- [c] Write a note on "Optimality of the EDF algorithm". [3]
- [d] Explain RADAR system with neat diagram. [4]

2

- [a] Discuss Priority driven scheduling and compare the preemptive and non preemptive approach. [4]
- [b] What are to be considered as the practical considerations for Slack stealing in Deadline-Driven Systems? Explain. [4]
- [c] Write a note on: Weighted Round Robin [3]
- [d] Explain LRT algorithm with suitable example [3]

3 Attempt any Two

- [a] Explain Preemption Ceiling Protocol with suitable examples. [7]
- [b] Explain Stack Based Priority Ceiling Protocol with example [7]
- [c] Discuss Deferrable Server. Explain operations of deferrable server with suitable example. [7]

P.T.O.

4 Attempt any Two

[a] Write a note on

i) MPCP model ii) Multihop switched network [3.5+3.5]

[b] Explain Phase Modification Protocol with suitable example. [7]

[c] Show that under the control of the priority inheritance protocol, a job can be blocked directly by any lower priority job for at most once for the duration of one outermost critical section, in the absence of a deadlock [7]

5 Attempt any Two

[a] Discuss Weighted Fair Queueing algorithm. [7]

[b] Write a short note on: i) Thread Control Block, ii) POSIX [7]

[c] Explain RSVP(Resource-Reservation Protocol) in detail with a neat figure. [7]

***** END *****

DELHI TECHNOLOGICAL UNIVERSITY
SUPPLEMENTARY EXAMINATION EVEN 2018-19

Paper Code – EC- 6032
Time 3 hr.

RF, Microwave & Millimeter Circuits
Total mark- 100

Attempt any five question

Q.1

Define Swartz- christoffel transformation. How it can be used to derive the characteristic impedance of conventional strip line for pure TEM propagation.

(20)

Q.2

For a generalized microwave cavity excited by an electric current source J , find the expressions of electric and magnetic fields in terms of its resonant frequencies and resonant modes.

(20)

Q.3

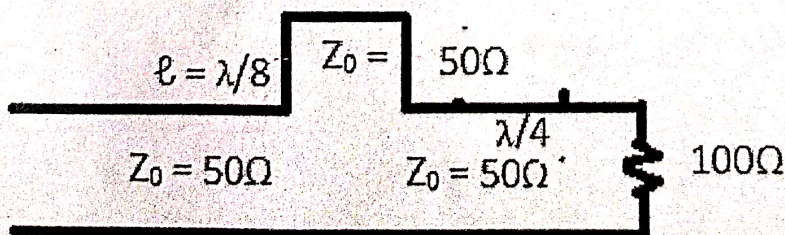
a) Find the ABCD matrix of a shunt element Y .

b) For given ABCD matrix of a two port network find its S matrix.

(10+10)

Q.4

a) Consider a transmission line with $Z_0 = 50\Omega$ with $Z_L = 100\Omega$ as shown in the fig. calculate the input impedance of the line where the shorted series stub is located at a distance of $d = \lambda/4$ from the load and has a length $\ell = \lambda/8$



P.T.O.

Q.6

With schematic diagram explain the generation of QPSK signal. Draw its constellation diagram. How we can find out the probability of symbol error if it is transmitted through AWGN channel with $PSD = N_0/2$ /Watts/Hz.

(8)

Q.7

Write notes on any two of the following:

- i) DPCM
- ii) MSK
- iii) ASK

(4+4)

— END —

-19-

Total no. of Pages 1

Roll No.

SECOND SEMESTER

M.Tech. (SPDD)

SUPPLEMENATARY EXAMINATION

(SEP.-2019)

**Blind Estimation Using Higher Order Statistics
(EC6233)**

Time: 3 Hours

Max. Marks : 100

Note : Answer *Any Five* questions.
Assume suitable missing data, if any.

- 1(a) Give the mathematical expressions for moment and cumulant estimation.
- 1(b) Represent the nonminimum phase system using minimum phase and all pass system.
- 2(a) Describe Sato, Constant modulus algorithms.
- 2(b) Describe Benveniste Goursat and stop and go algorithms
- 3(a) Draw the block diagram of blind equalizer and explain. Also write equalisation criteria.
- 3(b) Describe the decomposition of non minimum phase channel and channel estimation.
- 4(a) Describe the steps of EVA (eigen vector approach).
- 4(b) Describe the general BSS (blind source separation) problem and its assumptions for waveform preserving solution.
- 5(a) Describe two the conditional mean estimator.
- 5(b) Describe in detail two BSS methods based on HOS (higher order statistics).
- 6 Define the following:- (a) MSE (b) Quality of the estimated mixing matrix (c) ISI (d) Degree of statistical independence (e) Computational complexity (f) Measure of tail lengths (g) Measure of asymmetry (h) AGTM (i) LMS (j) LTS.

Total No. of Pages: 2

-20-

Roll No.

M.Tech (MOC)

SECOND SEMESTER

SUPPLEMENTARY EXAMINATION

(SEPT-2019)

EC 6522 OPTICAL ELECTRONICS

Time: 3 Hour

Maximum Marks: 100

Note : Question no. 1 is compulsory. Attempt any four from rest.

1. (a) In media possessing Centro-symmetry, the second order nonlinearity is absent. Comment on this statement. [4]
- (b) Write down the consequences of nonlinear media. Graphically illustrate the Second harmonic generation (SHG). [4]
- (c) Why magnitude of nonlinearity in optical fiber is much higher than that in bulk material? [4]
- (d) Discuss the importance of phase matching condition in brief. Calculate the reduction in the efficiency of SHG generation with following inputs. [4]
 $n_2 - n_1 = 0.01$, $\lambda = 1 \mu\text{m}$ and $z = 1 \text{ cm}$
- (e) For a longitudinal amplitude modulator, plot the output light intensity if the bias voltage is $V(t) = (0.5 + 0.1 \sin \omega_m t) V_x$. [4]
2. Discuss the various interesting consequences of non-linear medium. Write down the coupled equation under phase matching condition for second harmonic generation. Solve the equation assuming that amplitude of second harmonic amplitude is zero when incident radiation interact with non-linear medium and find out the efficiency second harmonic generation. [20]
3. Light can be controlled by light itself. Comment on this statement. Show that in the presence of third order non linearity, under certain condition medium acts as convex lens, the focal length of which

controlled by the intensity of incident light. Show that a minimum power is required for this fascinating effect. [20]

4. Discuss the concept of three wave mixing. Starting from the equation

$$\frac{dE_1}{dz} = -i\kappa_1(E_2, E_3)e^{-i\Delta k z}$$

$$\frac{dE_2}{dz} = -i\kappa_2(E_1, E_3)e^{-i\Delta k z}$$

$$\frac{dE_3}{dz} = -i\kappa_3(E_1, E_2)e^{i\Delta k z}$$

$$\text{where } \kappa_i = \left(\frac{\mu_0 c d}{2}\right) \left(\frac{\omega_i}{n_i}\right)$$

Show that for phase matching condition

$$\frac{d(|A_1|^2)}{dz} = \frac{d(|A_2|^2)}{dz} = -\frac{d(|A_3|^2)}{dz}; \text{ where } A_i = \sqrt{\frac{n_i}{\omega_i}} E_i$$

Discuss the conclusion of this relation. [20]

5. Briefly explain the difference between Raman-Nath diffraction and Bragg diffraction. Show that the amplitudes of m^{th} order diffracted waves at angle $\sin^{-1}\left(\frac{m\lambda_0}{n_o \Lambda}\right)$ are given by $E_0 J_m(\phi)$. Discuss how this diffraction is different from the plane transmission grating diffraction. [20]
6. Define optical parametric amplification. How this amplifier can be used as oscillator? Also derive the expression for required threshold power for designing the singly resonant optical parametric oscillators. Why it is difficult to design doubly resonant optical parametric oscillators in comparison to singly resonant optical parametric oscillators? [20]

Total No. of Pages: 01
M.Tech. (VLSI Design)
Supplementary Exam

Roll No.:
Second Semester
Sep 2019

EC-6613: RF CIRCUITS IN CMOS TECHNOLOGY

Time: 03 hours

Max. Marks: 100

Note: All questions are compulsory

Assume suitable missing data, if any.

1. [a] Explain cross modulation. [10]
[b] Explain intermodulation. [10]
2. [a] Explain RFID technology in detail. [10]
[b] Explain IoT. [10]
3. [a] Explain in brief different types of receiver architectures. [10]
[b] Differentiate between channel selection filtering and band selection filtering. [10]
4. [a] Differentiate between constant-LO downconversion mixing and constant-IF downconversion mixing. Which is better and why? [10]
[b] Calculate IP_3 for cascaded nonlinear stages. [10]
5. [a] Explain cognitive radio technology. [10]
[b] Explain IP_3 . [10]

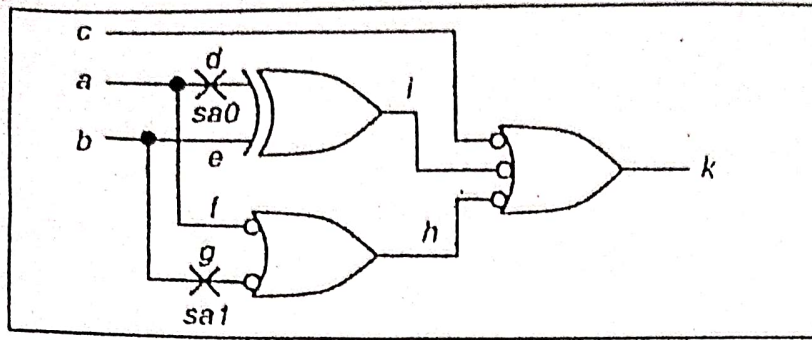


Figure 2

[b] Explain Boolean difference method for fault detection in combinational circuits with the help of an example. (5)

Q.10 Write propagation D-cubes of the following gates: (10)

- (i) NOT
- (ii) NAND
- (iii) OR
- (iv) EX-OR
- (v) NOR

Q.11 For the Circuit Under Test shown in Figure 3, design the BIST architecture as per the following specifications: Use LFSR with characteristic polynomial $x^4+x^3+x^2+1$ and seed 0001. Use SISR with characteristic polynomial $x^4+x^3+x^2+1$ as ORA and obtain the signature. (10)

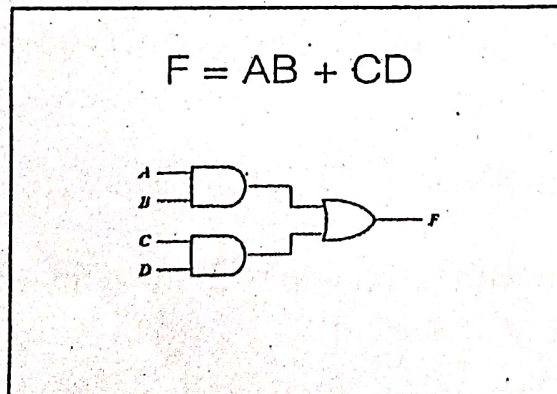


Figure 3

Q.12 Draw the architecture of Built in Logic Block Observer (BILBO) and explain its mode of operations. (10)

***** END *****

Total No. of Pages:04

SEMESTER- 2nd

Roll No.....

M.Tech-VLSI Design and Embedded Systems

Supplementary Examination

Sept-2019

EC6623- Testing and diagnosis of Digital System

Time: 3:00 Hours

Max. Marks : 100

Note : Answer any 10 questions.
All questions carry equal marks.
Assume suitable missing data, if any.

Q.1 Given a MARCH test:

(10)

$\{\downarrow(w0); \uparrow(r0,w1); \downarrow(r1, w0); \downarrow(r0)\}$.

Answer the following questions:

- (i) How many march elements are there in this test and what is the length of the test?
- (ii) Check if it can excite and detect s-a-0 faults. Show your work for full credit.
- (iii) Consider a memory fault in which whenever the content of cell 250 is changed, the cell 200 will also change state (inversion coupling fault). Will the above fault be detected? If yes, in which march element?
- (iv) Consider a fault in which a writing a 1 to the memory location 1523 causes the cell 249 to change from 1 to 0. Will this test detect such a fault? If yes, when will the fault be excited and when will it be detected. If no, explain.
- (v) Write the pseudo code for this march test.

Q.2 Write short notes on the following:

(10)

- (i) Stuck-at faults
- (ii) Bridging faults
- (iii) Stuck open faults
- (iv) Controllability and Observability
- (v) Equivalent faults

1231

Q.3 For the circuit shown in Figure 1, use D-Algorithm to find the test vector (ABC) to detect stuck-at-0 fault on line 5. Show all the steps for full credit. (10)

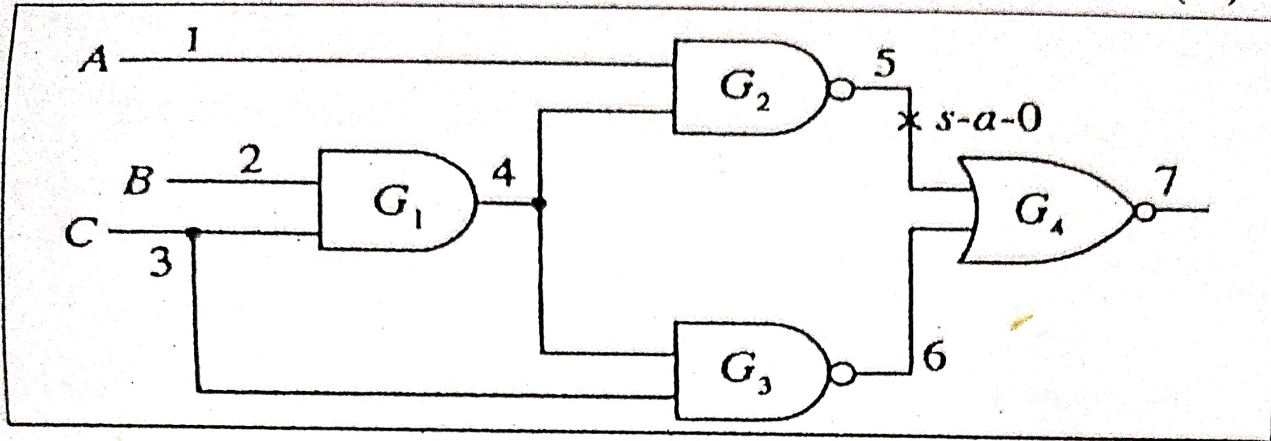


Figure 1

Q.4 [a] For the circuit shown in Figure 1, find and mark all possible single stuck at faults. (4)

[b] Use PODEM to determine the test vector to detect single stuck at-0 fault on line 5. (6)

Q.5 In a test generation process for a combinational circuit six tests, $t_1, t_2, t_3, t_4, t_5, t_6$ are generated to cover a set of given faults. Later it is discovered that we are interested only in a subset of the faults and the subset consists of eight faults, $f_1, f_2, f_3, f_4, f_5, f_6, f_7, f_8$.

Though simulating the six tests for each of the faults (without fault dropping) we find the detection capability of each test as given below:

- The test t_1 can detect faults f_4 and f_6
- The test t_2 can detect faults f_3 and f_8
- The test t_3 can detect faults $f_3, f_4,$ and f_8
- The test t_4 can detect faults $f_2, f_3,$ and f_8
- The test t_5 can detect faults $f_5,$ and f_7
- The test t_6 can detect faults f_2, f_5, f_7 and f_1 .

Find a smallest set of tests that can detect all eight faults. You must show your work to prove that the set obtained by you is the smallest set. (10)

-24-

Q.6 [a] Write any two differences between distinguishing and homing sequence. (2)

[b] Determine all possible distinguishing sequences for the state table shown in Table 1. (4)

Table 1

Present State	Next State, Output	
	Input $x=0$	Input $x=1$
A	C,0	D,1
B	C,0	A,1
C	A,1	B,0
D	B,0	C,1

[c] Develop a homing tree for the state table shown in Table 1. (4)

Q.7 [a] Design Linear feedback shift registers for the following characteristic polynomials: (6)

(i) $\Phi(x) = x^4 + x + 1$

(ii) $\Phi(x) = x^3 + x + 1$

(iii) $\Phi(x) = x^3 + x^2 + 1$

[b] Write any two differences between pseudo-exhaustive testing and pseudo random testing. (4)

Q.8 [a] How combinational circuit testing is different from sequential circuit testing? (4)

[b] Explain scan path technique with the help of a block diagram. (6)

Q.9 [a] Show that the two faults d s-a-0 and g s-a-1 are equivalent in Figure 2. (5)