24/12/11 T.E. (EXTC). Sem VI.
Elective :- Digital Telephony.

VT-Sept.-11- 194

Con. 6891–11. **MP–3643**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.

1. (a) Explain the principles of ISDN. **5**
   (b) Compare features of ATM and frame relay. **5**
   (c) Explain the principles of Time Slot Interchange (TSI) switch. **5**
   (d) Define the following terms w.r.t. traffic Engineering :– **5**
      (i) Erlung
      (ii) Busy Hour.

2. (a) Explain Touch Tone dialling in detail. **5**
   (b) Describe Lost Calls Held (LCH) system. **5**
   (c) Explain ATM layers in details. **10**

3. (a) Draw functional block diagram of STS switch. Derive the expression for blocking probability of STS switch using Lee's graph. **10**
   (b) Explain ISDN protocol architecture at user Network Interface. **10**

4. (a) Explain SS7 protocol architecture. Also explain signal unit formats for signalling link level. **10**
   (b) Explain TCP/IP protocol architecture. **10**

5. (a) What is the blocking probability of a PBX to a central office trunk group with 10 circuits servicing a first attempt offered traffic load of 7 erlangs ? What is the blocking probability if the number of circuits is increased to 13 ? Assume random retries for all blocked calls. **10**
   (b) Explain Time Division Time switching in detail. **10**

6. (a) Explain the following terms w.r.t. Digital Switched Networks :– **10**
      (i) Network Control
      (ii) Network Synchronization.
   (b) Explain in detail the architecture of H·323 protocol suite for VOIP. **10**

7. Write short notes on :– **20**
   (a) Broadband ISDN
   (b) DTMF
   (c) Waiting Time Jitter
   (d) SIP Protocol for VOIP.

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15/12/11 TE EXTC -VI
T & V Engg.

5 2nd half.11-AM(f)

Con. 6559-11. **MP-3637**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** from remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume **data** if **necessary**.

1. (a) Why (G-Y) is not transmitted in colour television system ? **5**
   (b) Write advantages of using negative modulation in T. V. system. **5**
   (c) Write advantages of using AGC in T. V. system. **5**
   (d) Explain compatibility considerations in T. V. system. **5**

2. (a) Draw neat block diagram for NTSC coder and explain. **10**
   (b) Write characteristic features of NTSC and PAL systems. **10**

3. (a) Explain in detail interlaced scanning in T. V. system with appropriate diagrams. **10**
   (b) Draw neat diagram to indicate sync separator section in T. V. system and explain the same. **10**

4. (a) Draw neat block diagram for PAL coder and explain. **10**
   (b) Explain how phase errors are cancelled in PAL system. **10**

5. (a) Draw and label Vidicon Camera tube and explain its working. **10**
   (b) Write a note on Television Studio. **10**

6. (a) Compare delta gun, PIL and Trinitron picture tubes. **10**
   (b) Explain the function of colour killer circuit. **10**

7. Write short notes on any **three** of the following :— **20**
   (a) CATV and MATV
   (b) Frequency Interleaning
   (c) Composite Video Signal
   (d) Digital T. V.

5/12/11 TE EXTC Sem-VI (R)
Antenna & Wave Propagation

VT-Sept.-11- 135

Con. 6181–11. **MP–3634**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Assume **suitable** data if **required**.
(3) Solve any **four** questions from **remaining** questions.

1. Explain the following :– **20**
   (a) FRISS transmission equation
   (b) Radiation pattern of short dipole
   (c) Linear v/s planner array
   (d) Rectangular Microstrip Antenna and its feed network.

2. (a) Draw the measurement setup to find gain and radiation pattern of the antenna. **10**
   (b) Explain space wave propogation. Determine the radio horiton of a space wave propogation if the height of a transmitting antenna is 60 mts. and that of receiving antenna is 6 mts. Assume standard atmosphere. **10**

3. Consider a corner reflector with an included angle of $\alpha = 36°$. **20**
   (a) Derive the array factor.
   (b) Plot the relative field strength along the axis ($\theta = 90°$, $\phi = 0°$) as a function of the feed-to-vertex spacing s_1 for $0 \leq s/\lambda \leq 10$.
   (c) Determine the spacing that yields the first maximum possible field strength along the axis. For this spacing, what is the ratio of the field strength of the corner reflector along the axis to the field strength of the feed element alone ?
   (d) For the spacing in part c, plot the normalized power pattern in the azimuthal plane ($\theta = 90°$).

4. Explain various frequency independent antennas also explain the design procedure of each. **20**

5. (a) An array of 4 isotrophic sources is formed by placing one at the origin, and one along the x-, y-, and z-axes a distance d from the origin. Find the array factor for all space. The excitation coefficient of each element is identical. **10**
   (b) Principle of pattern multiplication and its applications in linear and Nonlinear arrays. **10**

6. (a) When a linear dipole is called a infinitesimal dipole or a small dipole or a finite length dipole ? Compare infinitesimal dipole, small dipole and halfwave length dipole in terms of current distribution, radiation resistance, effective length and directivity. **10**
   (b) Write the far-zone electric and magnetic fields radiated by a magnetic dipole of $l = \lambda/z$ aligned with the z-axis. Assume a sinusoidal magnetic current with maximum value I_{mo}. **10**

10

7. (a) Define :–
   (i) Radiation Pattern
   (ii) Directivity
   (iii) Beam Width
   (iv) Band Width
   (v) Polarization. 10

   (b) Derive the expression for vector potential wave equation. 10

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30/11/11 TE (EXTC) Sem-VI (CR).
MPMC-II

28 : 2nd half.11-AM(d)

Con. 5990-11. **MP-3662**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Any **four** questions out of remaining **six** questions.
(3) Assume suitable **data**, wherever required with **justification**.
(4) **Figures** to the **right** indicate **full** marks.

1. (a) Design 8086 Microprocessor based system with following specifications :— **12**
   (i) 8086 Working at 6 MHz
   (ii) 16 KB EPROM using 8 KB Chips
   (iii) 16 KB SRAM using 8 KB Chips.
   (b) Draw the memory organisation of PIC 18 controller and explain. **8**

2. (a) Draw interface diagram of 8086 with 8087 and explain various interface signals and working. **10**
   (b) Convert the decimal number 125·125 into short real, long real format of 8087. **10**

3. (a) Explain the interrupt structure of 8086 Microprocessor with respect to 8259 PIC. **10**
   (b) Draw the PSW of 8086 and explain setting of different bits with example. **10**

4. (a) Draw and explain interfacing of 8086 with 8255. **10**
   (b) Write 8086 based program to transfer n bytes of data from source memory area to the destination memory area. **10**

5. (a) With neat diagram explain the different instruction formats of PIC 18 controller. Also give the comparison of bit size of OPcode for different instructions. **10**
   (b) Draw the flow chart and write assembly language program for PIC 18 controller to read and write ten bytes from program memory to data memory. **10**

6. (a) Explain the addressing modes of PIC 18 controller with suitable example. **10**
   (b) Discuss the pipeline concept used in PIC 18. **10**

7. Write short notes on any **two** of the following :— **20**
   (a) Stack related instructions of PIC 18.
   (b) Dual functionality of parallel ports of PIC 18
   (c) String instructions in 8086.

L 10/12/2011 TE EXTC Sem-VI CBSGS DC

AGJ 2nd half (d+) 18

Con. 6513-11. **(REVISED COURSE)** **MP–3655**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No.1 is compulsory
(2) Attempt any four questions out of remaining six questions.

1. Explain any four :
   a). Shannon Hartley theorem b). Intersymbol interference c). Correlator
   d). Binary BCH codes e). Nyquist's criterion for base band signals (20)

2. a). Explain the working of QPSK system with neat block diagrams. (10)
   b). Explain the working of M-ary FSK Transmitter and receiver. Plot the spectrum and calculate the bandwidth. (10)

3. a). Draw the signal space representation of QAM system. Calculate the Euclidean distance between two symbols. Derive an expression for transmitted signal. (10)
   b). Calculate the error probability of matched filters. (10)

4. a). Consider a (7, 4) cyclic code generated by $g(x) = 1 + x + x^3$. Design an encoder using shift registers and find out the code word for the message (1 1 0 1) using shift registers and generator matrix. (02+05+05)
   b). Explain burst error correcting codes (08)

5. a). Define entropy and information rate. Consider six messages with probabilities 0.2, 0.25, 0.15, 0.1, 0.2 and 0.1. Calculate the entropy of the source. (08)
   b). Consider (3, 1, 2) convolution code with $g^{(1)} = (100)$, $g^{(2)} = (111)$, $g^{(3)} = (110)$. Draw state diagram, Trellis diagram and Tree diagram. Find out the codeword for the message 11101. (12)

6. a). Explain the working of duo binary encoder with precoder. What are the drawbacks of duo binary encoder? Plot the spectrum of duo binary encoder. (10)
   b). Explain Hamming codes and shortened Hamming codes. (10)

7. Write short notes on any two : (20)
   a). Equalizers
   b). Decoding of linear block codes
   c). MSK transmitter and Receiver

20/12/2011 TE EXTC Sem - VI
IE & TR

IInd/ half-11-S.G. 71

Con.6724-11. **MP-3658**

(2 Hours) **[Total Marks :50**

N.B.: (1) Solve any **five** questions.
(2) Question No. **1** is **compulsory**.
(3) Solve any **four** from **remaining**.

1. Explain supply and demand for money. Also explain functions of money. **10**

2. Explain I.T.U.'s. role in global communication. **10**

3. (a) Explain the causes of inflation. **5**
(b) Define and explain the term economics. **5**

4. (a) Explain price discrimination with suitable example. **5**
(b) Explain planning with suitable example. **5**

5. (a) Explain the objectives of market research and its process. **5**
(b) Explain Blanchard's situational leadership theory. **5**

6. (a) Explain regulatory strategy and price controls. **5**
(b) What do you mean by theory of International Trade ? **5**

7. (a) Comment on shortcoming and improvement in banking system. **5**
(b) Explain any one organizational structure. **5**

TE EXTC VI (CR) 24/12/11
Radars Engg.

5 2nd half.11-AM(g)

Con. 6890-11. **MP-3652**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume suitable **data** wherever **necessary** and justify.

1. Answer any four only. 20

(a) Discuss about the frequency ranges in which radar operates.

(b) What is stagger pulse repetition frequency? Explain.

(c) Explain briefly the factors that influence bandwidth of radar.

(d) Calculate the maximum range of a radar system ,which operates at 4cm with a peak pulse power of 500KW ,if its minimum receivable power is 13W, the capture area of antenna is $4m^2$ and radar cross section area of target is $20m^2$.

(e) Differentiate between amplitude comparison and phase comparison methods of monopulse tracking.

2(a) Derive a expression for range of a radar. 10

(b) Draw block diagram of a MTI radar and explain each block in detail. 10

3(a) Draw and explain the frequency response of delay line canceller. 10

(b) Explain effect of weather on radar. 5

(c) Explain in brief radar resolution cell. 5

4.(a) Define land and sea clutter. Describe surface clutter equation and its implication. 10

(b) What are RCS fluctuation? Explain different swerling models for RCS fluctuations. 10

5.(a) Explain various scanning methods for radar. 10

(b) Define integration loss, integration improvement factor, blind speed and noise aperture. 10

6.(a) List advantages of phased array antennas over conventional antenna for radar application. 10

(b) Explain various losses occurring in radar systems. 10

7. Write short notes on : 20

(a) CW radar

(b) Staggered PRF's

(c) Doppler filter banks

(d) Displays used in radar systems.

24/12/11 TE EXTC VI (R)
Micro Electronics

41 : 2nd half.11-AM(f)

Con. 6892-11. **MP-3646**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions from **remaining** questions.
(3) Assume suitable **data** wherever **necessary** and mention the **same** in answer sheet.

1. (a) Draw and explain the profile for diffusion from — 5
   (i) constant source
   (ii) instantaneous source.
   (b) Explain various isolation techniques in brief. 5
   (c) Compare PMOS, NMOS and CMOS technology with respect to their advantages and drawbacks. 5
   (d) Describe the formation of resistors in integrated circuit. 5

2. (a) A melt contains 0·1 atomic percent phosphoracy in silicon. Assume well mixed approximation with segregation coefficient of phosphoracy to be 0·35. Calculate the dopant, concentration when 10% of the crystal is puled, when 50% of the crystal is pulled and when 90% of the crystal is pulled out. The Si has atomic density of 5×10^{22} atoms/cm^3. 5
   (b) With neat diagram explain Czochralski method for crystal growth. 5
   (c) Explain in detail the different processes used to pattern the silicon oxide (SiO_2). 10

3. (a) Explain in detail different parasitic effects in BJT. 10
   (b) With the help of cross-section diagram explain — 10
   (i) Lateral PnP
   (ii) Vertical PnP transistor fabrication.

4. (a) Describe various short channel effects in MOSFET. 10
   (b) What is latchup in CMOS ? What are the different methods to avoid latchup ? Draw neat diagrams to describe the concept. 10

5. (a) How capacitors are fabricated in integrated circuit ? What are the different types of integrated circuit capacitors ? Explain with neat diagrams. 10
   (b) Describe any two methods of fabrication of monolithic resistors in detail. 10

6. (a) Determine pull up to pull down ratio $\left[\frac{Z_{PU}}{Z_{PD}}\right]$ for an NMOS inverter driven by another NMOS inverter. 10
   (b) Describe the necessity and significance of design rules. 5
   (c) Using λ based design rules, design 2 input CMOS NAND gate. Also draw stick diagram for the same. 5

7. Write short notes on any **four** of the following :— 20
   (a) Concept of sheet resistance
   (b) Monolithic Planar diode
   (c) Twin tub process
   (d) IC inductors
   (e) TTL NAND gate.

24/12/11 TE EXTC VI (R)
Acoustics Engg

58-p3-upq-Con/scan File

Con. 7040-11. **MP–3640**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data wherever **required**, but justify the **same**.

1. (A) Find out the speed of sound in air at 0°C and one atmospheric pressure. Air has density 1.293 kg/cm^3 and ratio of specific heats 1.402 at 0°C. 05
(B) Explain in brief any two fundamental properties of acoustic transducers. 05
(C) A room of 10m x 10m x4m has an average Sabine absorptivity $\bar{a} = 0.1$, Calculate its reverberation time. 05
(D) Explain the construction and working of moving coil electro-dynamic microphone. 05

2. (A) Explain in brief the principle of acoustic reciprocity and its application to simple sources. 10
(B) What are the methods of images ? 10

3. (A) Explain in detail the Helmholtz resonator. 10
(B) Explain in brief the following terms of acoustic waves:
(i) Acoustic intensity (ii) specific acoustic impedance
(iii) Energy density and (iv) Speed of sound in fluids. 10

4. (A) State and explain the fundamental properties of hearing. 10
(B) Explain the phenomenon absorption of sound from viscosity. 10

5. (A) What are the different sound absorption materials in acoustic design? Explain in brief their selection criteria. 10
(B) Explain the noise induced hearing loss and also state the permissible daily noise exposure limits for industrial environment by OSHA. 10

6. (A) Explain the calibration of receivers. 10
(B) Compare the operation of carbon and piezoelectric microphones. 10

7. Write short notes on (Any Two): 20

(A) Highway noise.
(B) Acoustic filters- high pass and low pass
(C) Types of loudspeaker cabinets.

24/12/11 (EXTC) sem VI.

Elective I:- Neural Networks and Fuzzy logic

Con. 6896-11. **(REVISED COURSE)** **MP–3649**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No.1 is **compulsory**.
(2) Solve any **four** questions from remaining **six**.

Q.1. (a) Explain any two types of defuzzufication techniques. (20)

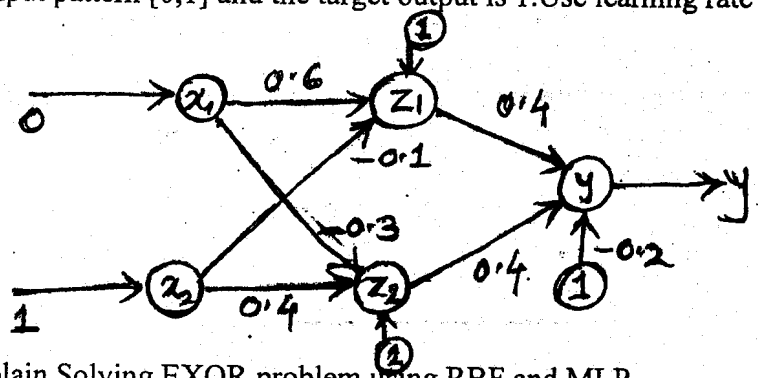
(b)Explain Widro Hoff learning rule.

©What is evolutionary Computing? How is it useful in soft computing?

(d)Explain any two properties of fuzzy sets.

Q.2. (a) Explain Function approximation using Radial Basis Function Neural network. Compare RBF and MLP. (10)

(b) Using back propagation network find the new weights for the net shown in figure .It is presented with input pattern [0,1] and the target output is 1.Use learning rate 0.25 and binary sigmaidal function. (10)



Q.3. (a)Explain Solving EXOR problem using RBF and MLP. (10)

(b)Explain Boltzmann Machine with architecture and algorithm. (10)

Q.4. (a)What is Self organizing map? Explain Kohonan SOM with learning algorithm. (12)

(b) For speed control of DC motor the membership functions for series resistance, armature current and speed are : (8)

$R=\{\frac{0.4}{30}+\frac{0.6}{60}+\frac{1}{100}+\frac{0.1}{120}\}$

$I=\{\frac{0.2}{20}+\frac{0.3}{40}+\frac{0.6}{60}+\frac{0.8}{80}+\frac{1}{100}+\frac{0.2}{120}\}$

$N=\{\frac{0.35}{500}+\frac{0.67}{1000}+\frac{0.97}{1500}+\frac{0.25}{1800}\}$

Find the following:

(i)S=R X I (ii) T=I XN (iii)P=S o T (by max-min composition) (iv) P=S o T

(by max product composition).

[TURN OVER

Q.5. (a)Draw and explain Discrete Hopfield network. (10)

(b)Give and explain any one application of genetic algorithm. (10)

Q.6. Design fuzzy controller to design wash time of a fuzzy washing machine. Assume that the inputs are dirt and grease on the cloths. Consider three input descriptors for the inputs and five for the output.derive a set of rules for control action and defuzzification.The design should be supported by figures wherever possible. Clearly indicate that if the clothes are soiled to large degree the time required for washing is also more. (20)

Q.7. Write short note on **Any Two :**

(a)RBF learning strategies

(b)Brain-state-in-a-box

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(d)Character recognition using Neural network. (20)