

QP Code : **MV-18318**

(3 Hours)

[Total Marks : 100

N.B. (1) Question No. 1 is **compulsory**.

(2) Attempt any “**four**” questions form remaining **six** questions.

(3) Assume **suitable** additional data if **required**.

1. (a) Explain different transmission systems used in Telephony. 5
 (b) Explain Grade of service (GOS) with respect to Traffic analysis. 5
 (c) What is the significance of ATM adaptation layer. 5
 (d) Draw the 'ISDN' Architecture. 5
2. (a) Explain the concept of common control in crossbar switching system. 10
 (b) Compare single stage and multistage space division switching system. 10
 (c) Explain principle of Time slot Interchange (TSI) switch 10
3. (a) Explain user level and Network level signalling in ISDN. 10
 (b) Describe multi protocol label switching in detail. 10
4. (a) Explain in detail ISDN Data link layer protocol 10
 (b) Explain in detail signalling system No. 7 elements. 10
5. (a) Draw ATM cell format and explain any one ATM application in detail. 10
 (b) What is Resource Reservation Protocol (RSVP) ? Explain in detail. 10
6. (a) Explain what is wireless in Local Loop (WLL). 5
 (b) Compare features of ATM over frame Relay. 5
 (c) Explain Time Assigned speech Interpolation (TASI) w.r.t. lost call returned system. 10
7. Write short notes on :
 - (a) ISDN channels 6
 - (b) H. 323 protocol suite for VoIP. 7
 - (c) ATM protocol architecture. 7

- N.B.: 1. Q. No.1 is compulsory
 2. Answer any 4 of the remaining 6 questions
 3. Figures to the right indicate the marks
 4. Assume suitable data, if necessary and state them clearly

Q.1. Answer any 4 questions from the given questions:

a. Consider the two fuzzy sets

5

$$\tilde{A} = \left\{ \frac{0.35}{0.7} + \frac{0.625}{0.725} + \frac{0.256}{0.75} \right\}$$

$$\tilde{B} = \left\{ \frac{0.95}{0.7} + \frac{0.815}{0.725} + \frac{0.67}{0.75} \right\}$$

Using Zadeh's notation, express the fuzzy sets as λ -cut set for $\lambda = 0.8$ for the following operation:

$$\overline{\tilde{A} \cup \tilde{B}}$$

b. Explain fuzzy graph and fuzzy matrix with an example.

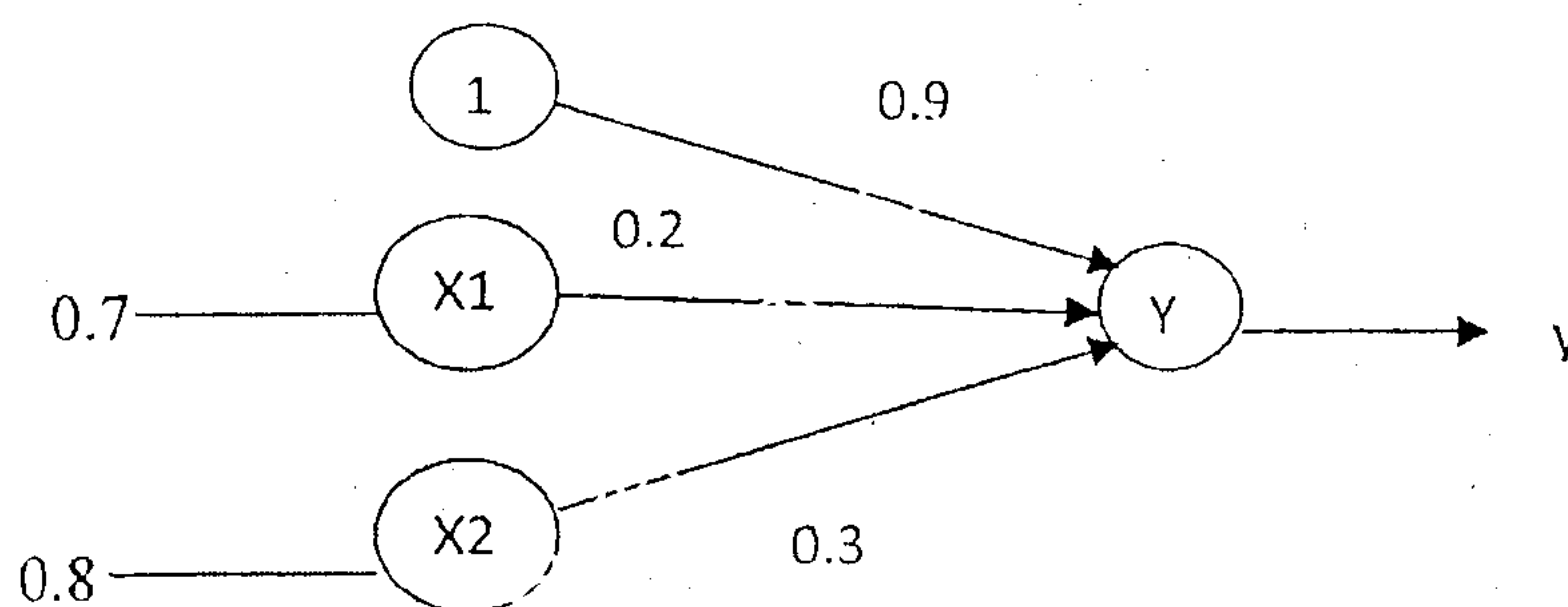
5

c. Write any three differences between supervised and unsupervised learning.

5

d. Calculate the output of the neuron Y for the net given below. Use binary and bipolar sigmoidal activation functions.

5



e. State any two applications of Kohonen self-organizing map.

5

f. What is the necessity of de-fuzzification process.

5

Q.2.a. Explain any 4 the membership functions. 10

b. Three fuzzy sets are defined as follows: 10

$$\tilde{A} = \left\{ \frac{0.1}{30} + \frac{0.2}{60} + \frac{0.3}{90} + \frac{0.4}{120} \right\}$$

$$\tilde{B} = \left\{ \frac{1}{1} + \frac{0.2}{2} + \frac{0.5}{3} + \frac{0.7}{4} + \frac{0.3}{5} + \frac{0}{6} \right\}$$

$$\tilde{C} = \left\{ \frac{0.33}{100} + \frac{0.65}{200} + \frac{0.92}{300} + \frac{0.21}{400} \right\}$$

Find the following:

(a) $\tilde{R} = \tilde{A} \times \tilde{B}$

(b) $\tilde{S} = \tilde{B} \times \tilde{C}$

(c) $\tilde{T} = \tilde{R} \circ \tilde{S}$ using *max - min composition*

(d) $\tilde{T} = \tilde{R} \circ \tilde{S}$ using *max - product composition*

Q.3.a. Describe simulated annealing. Explain Boltzmann machine with training phase. 10

b. Draw and explain radial basis function neural network for: 10

i) Function approximation

ii) Classification.

Q.4.a. Find the weights required to perform the following classification using 15

Perceptron network. The vectors (1, 1, 1, 1) and (-1, 1, -1, -1) are belonging to the class with target output 1 and vectors (1, 1, 1, -1) and (1, -1, -1, 1) are belonging to the class with target output 0. Assume learning rate to be 1 and initial weights to be zero. (calculate upto three epochs)

b. List the limitations of Perceptron. 5

- Q.5.a. With a neat diagram, explain Kohonen Self organizing maps and list its important features. 10
- b. What are discrete Hopfield networks and mention any two applications of the same. 10
- Q.6.a. Explain the operation of the fuzzy logic control with process inference block. 8
- b. Write about Genetic algorithm and give any one application 8
- c. Explain the delta learning rule. 4
- Q.7. Write notes on any two: 20
- a) Brain – state –in- a- box model
 - b) Adaptive neuro-fuzzy information systems (ANFIS)
 - c) Stopping criteria for neural network training
 - d) Mamdani and Takagi architecture
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QP Code : MV-18312

(3 Hours)

[Total Marks : 80

- N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any four questions from the remaining six questions.
(3) Assume suitable data wherever necessary.

1. Solve any four :- 20
- (a) List different types of resistors used in monolithic Integrated Circuit. Draw cross-section of one of them.
 - (b) In N-channel E-MOSFET $V_{GS} = 5\text{ V}$, $V_{DS} = 5\text{ V}$, $V_{TO} = 1.0\text{ V}$, $V_{BS} = 0\text{ V}$, $W = 10\text{ }\mu\text{m}$, $L = 5\text{ }\mu\text{m}$, channel length modulation factor $\lambda = 0.02\text{ V}^{-1}$ and $\mu_n C_{OX} = 100\text{ }\mu\text{A/V}^2$. Calculate its drain current.
 - (c) Draw cross-section for all possible configuration of monolithic planar diode. Which one is the best and why ?
 - (d) List advantages of MOSFET technology over Bipolar technology.
 - (d) Draw and explain the doping profile obtained from constant impurity source diffusion and limited impurity source diffusion.
2. (a) Discuss in detail different parasitic effects in MOSFETS. 10
- (b) What are different types of scaling ? Explain them in detail with their respective advantages and disadvantages. 10
3. (a) With neat diagram explain Czochralski method for single crystal growth. 10
- (b) Explain in detail the fabrication sequence of BJT with cross section of each step along with mask used. Explain the need for epitaxial layer. 10
4. (a) With the help of neat diagrams, explain the process of ion implantation. What are the advantages of ion implantation process over diffusion process. 10
- (b) Draw circuit diagram, stick diagram of CMOS inverter. Also draw layout of CMOS inverter using lambda rules (λ). Take size of PMOS as twice the size of NMOS. 10
5. (a) Implement following function :- 10
- $y = AB + C(D + E)$ using
- (i) Depletion load NMOS technology
 - (ii) Saturated load NMOS technology
 - (iii) CMOS technology.
- (b) How capacitors are fabricated in MOS and BJT technology. Draw cross-sections of each structure.

6. (a) Calculate threshold voltage at $V_{SB} = 0$ V for a polysilicon gate n-channel MOS transistor with following parameters :- 10

Substrate doping density $N_A = 10^{16} \text{ cm}^{-3}$,

Polysilicon gate doping density $N_D = 2 \cdot 10^{20} \text{ cm}^{-3}$,

Gate oxide thickness $t_{ox} = 500 \text{ \AA}$, and

Oxide-interface fixed charge density $N_{OX} = 4 \times 10^{10} \text{ cm}^{-2}$,

Intrinsic concentration $n_i = 1.45 \times 10^{10} \text{ cm}^{-3}$, $\frac{kT}{q} = 26 \text{ mV}$

$\epsilon_0 = 8.85 \times 10^{-14} \text{ F/cm}$, $\epsilon_{si} = 11.7 \epsilon_0$, $\epsilon_{ox} = 3.97 \epsilon_0$.

$q = 1.6 \times 10^{-19} \text{ C}$.

- (b) For resistive load NMOS inverter 10

$R_L = 20 \text{ K}$, $V_{TO} = 1\text{V}$, $\mu_n C_{OX} = 100 \mu\text{A/V}^2$,

$W = 20 \mu\text{m}$, $L = 1 \mu\text{m}$, Find V_{OH} , V_{OL} , V_{IL} and V_{IH} .

Assume $V_{DD} = 5 \text{ V}$.

- 7 Write short notes on any **three** :- 20

- TTL NAND gate
- Buried and Butted Contact
- Isolation techniques used in BJT technology
- IC Cross-overs.

QP Code : MV-18315

(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.

1. (a) Explain the factors which govern the pulse repetition frequency. 20
(b) Explain briefly the factors that influence bandwidth of radar.
(c) Explain Doppler filter banks.
(d) Explain in brief displays used in radar system.
2. (a) Derive an expression for range of a radar. 10
(b) Draw block diagram of an MTI radar and explain each block in detail. 10
3. (a) Define land and sea clutter. Describe surface clutter equation and its implication. 10
(b) What are RCS fluctuations? Explain different Sweling models for RCS fluctuations. 10
4. (a) What are the basic differences between a search radar and a tracking radar? 10
Discuss the various scanning techniques and tracking mechanisms.
(b) With a suitable diagram explain the working of conical scan tracking radar. Explain 10
the various factors to be considered in determining the optimum squint angle.
5. (a) Draw and explain the frequency response of delay line cancellers. 10
(b) Explain in brief system losses in radar. 10
6. (a) What is meant by radar cross sections. Explain the same in the context of 10
(i) sphere (ii) Rod and (iii) cone.
(b) Explain in detail matched filter receiver of Radar. 10
7. Write short note on any three :- 20
(a) FM-CW altimeters
(b) Working of Hybrid Tee and circulator as duplexer in Radar
(c) Phased array Radar
(d) Staggered PRF's.

TE (EXTC) Rev, SEM VI
MPMC-II

May 2014
13/05/14

QP Code : MV-18092
[Total Marks : 100

(3 Hours)

Q1. Is compulsory

Solve any four out of remaining

Q1.

- A. Draw and explain read write bus cycle of 8086 in maximum mode. (5 marks)
- B. What are advantages of memory segmentation in 8086? (5 marks)
- C. Write features of PIC-18. (5 marks)
- D. Explain PIC 18 data memory organization. (5 marks)

Q2. A

Draw and interface diagram of 8086 microprocessor and 8087 NDP, also explain various interface signals and co-processor working with host processor. (10 marks)

Q2. B

Design a system using 8086 in minimum mode with following specifications

1. 8086 operating on 5 MHz
2. 16 KB RAM using 8 KB device with starting address of 10000.
3. 16 KB EPROM using 8 KB device. (10 marks)

Q3. A. What is string addressing mode of 8086. Explain string instructions of 8086. (10 marks)

Q3 B. Draw and explain interfacing of 8086(maximum mode) and 8259 in single mode. (10 marks)

Q4.A Write assembly language programme for 8086 to exchange a 1 KB block of data from memory location 40000 to 50000. (10 marks)

Q4 B Explain following instructions of PIC18

1. ANDLW *k*
2. BTFSC *f,b*
3. SUBLW *k*
4. DECFSZ *f,d*
5. RRF *f,d*

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Con. 10972-14.

- Q5. A Connect four 7-segment displays to PIC18 and write assembly language programme to display '5' on LSB of display. (10 marks)
- Q5 B Write instruction format of PIC 18 instructions. (10 marks)
- Q6A. Draw and explain interfacing of 8086 and 8257 DMA controller. (10 marks)
- Q6 B Explain I/O synchronization methods of PIC18. (10 marks)
- Q7. A. Explain interrupt structure of 8086. (10 marks)
- Q7 B. Explain assembler directives of 8086. (10 marks)
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QP Code : **MV-18133**

(3 Hours)

[Total Marks : 100

N. B. : (1) Question No. 1 is compulsory.

(2) Attempt any four questions from the remaining six questions.

(3) Assume suitable data if necessary, but justify the same.

1. (a) What do you mean by isotropic, omnidirectional and directional antenna. Draw radiation pattern and give example of each antenna. 5
- (b) Describe the concept of near field and far field regions. 5
- (c) Explain with the help of a diagram, how a reflector helps in increasing the directivity of an antenna. 5
- (d) Differentiate between broadside and end fire array. 5
2. (a) Derive expressions for electric and magnetic fields in far field region of an infinitesimal dipole. 10
- (b) State and derive Friis transmission equation. What is its significance in wireless communication. 10
3. (a) Explain the working principle of a folded dipole antenna. What are its advantages and applications. 10
- (b) Derive an expression of array factor of a uniform linear array of n elements. Also find the expressions for the position of principle maxima, nulls and secondary maxima. 10
4. (a) Explain pattern multiplication. Draw the radiation pattern of an array of two half wave dipoles which are fed in phase and placed along a line at $\lambda/2$ distance apart. 10
- (b) Design a rectangular microstrip antenna at 2.4 GHz on a substrate with dielectric constant 4.4 and substrate thickness 1.6 mm. 10
5. (a) How gain of an antenna is different from directivity. Explain a method used to measure the gain of an antenna. 10
- (b) Explain the mechanism of ionospheric propagation. Also define the terms - Critical frequency, virtual height, maximum usable frequency and skip distance. 10
6. (a) Explain the working principle of a Yagi-Uda antenna array. What are its advantages, disadvantages and applications. 10
- (b) Describe parabolic reflector antenna and its applications at microwave frequency. What are the various feeding methods used in parabolic reflector antennas. 10

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7. Write short notes on :-

20

- (a) Ground wave propagation.
 - (b) Log periodic antenna.
 - (c) Horn antenna.
 - (d) Polarization.
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Digital Communication
SEM VI
26/05/14
EXTC

QP Code :MV-18179

(3 Hours)

[Total Marks : 100

- N. B. : (1) Question No. 1 is compulsory.
(2) Attempt any four question from remaining six questions.
(3) Assume suitable data if necessary.

1. (a) Explain the function of a bit synchronizer. 5
(b) Distinguish between a matched filter and co-relator. 5
(c) Explain line codes and their characteristics. 5
(d) Explain shanon-Hartley Theorem on channel capacity. 5
2. (a) Explain M-ary FSK Transmitter and Receiver with neat block diagram. 10
(b) A Gaussian channel has 2 MHz bandwidth. Calculate the channel capacity if the signal to Noise Spectral density ratio is 10^4 . Also calculate the maximum information rate. 5
(c) Explain systematic and non-systematic error correcting codes. 5
3. (a) Draw and explain the block diagram of non-offset QPSK transmitter and receiver. Also draw output waveform. 10
(b) The generator polynomial for a (7, 4) cyclic code is 10
 $g(x) = 1 + x^2 + x^3$
(i) Draw the block diagram of Encoder and syndrom calculator.
(ii) Find the code polynomial of 0110.
4. (a) A $1/3$ rate, $k=3$ convolutional encoder can be described by the impulse response of the path given by :- 10
 $g_1 = 101, g_2 = 110, g_3 = 011$
(i) Draw the block diagram of encoder.
(ii) Draw the code tree and state diagram. Hence find out output sequence if the input to the encoder is 11010.
(b) Draw the signal space diagram of 16 QASK and calculate the Euclidean distance and compare it with 16-PSK. 10
5. (a) Define entropy and Information rate. A source emits symbols with the given probabilities 10
0.2, 0.25, 0.15, 0.1, 0.15, 0.05, 0.1
Calculate :-
(1) Entropy of source
(2) Huffman code
(3) Code Efficiency.
(b) What is equalization. Explain with block diagram a tapped delay line equalizer. 10

6. (a) Consider a (7, 4) code whose generator matrix is

10

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

(i) Find the code word for (i) 1101 (ii) 1001

(ii) Find out the parity check matrix

(iii) What is the error detecting and correcting capability of the code.

(b) Define the expression for

10

(1) Impulse response

(2) Propability of error of a matched filter.

7. Write short notes an (any two) :-

20

(1) Eye pattern

(2) ISI and ICI

(3) MSK.

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QP Code : **MV-18263**

(2 Hours)

[Total Marks : 50

- N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any **four** questions from remaining **six** questions.
(3) All questions carry equal marks.

1. Write short notes on any two of the following questions :- 10
 - (a) Explain Taylor's Scientific Management Theory.
 - (b) TRAI regulation.
 - (c) Broadband Policy.
 - (d) Effective communication in enterprises.

 2. (a) Explain the Masslow's need hierarchy. Compare it with Maintenance Motivation theory? 5
(b) Discuss Foreign Exchange Control. 5

 3. (a) Explain features of "Monopoly" and "Perfect Competition". Compare them. 5
(b) Explain the objective of market research and its process. 5

 4. (a) Explain guidelines for obtaining License for providing Direct to Home (D.H.T.) 5
(b) Discuss multiple credit creation. Who are the beneficiaries of this creation? 5

 5. (a) Explain price discrimination with suitable example. 5
(b) How does the basic concept of management are applicable to all kinds of business? 5

 6. (a) How does the government project international trade? 5
(b) Explain planning with suiible example. 5

 7. (a) Compare Direct and Indirect taxes. 5
(b) Give distinction between Balance of trade and Balance of payments. 5
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QP Code : MV-18222

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Question No.1 is compulsory.
(2) Out of remaining questions, attempt any four questions.

1. (a) Explain additive and subtractive colour mixing. 5
(b) What is chromaticity diagram? Explain it. 5
(c) How a light image is converted into electrical signal using photoconduction. 5
(d) What are the various streaming media protocols? 5
2. (a) Draw the block diagram of a monochrome TV transmitter and explain the working. 10
(b) What is the need of scanning? Explain progressive scanning in detail. 10
3. (a) Draw the composite video signal for three horizontal lines and explain the various components in details. 10
(b) Draw the neat block diagram of an NTSC coder and decoder and explain the functioning. 10
4. (a) Explain PAL coder system? How phase error are cancelled in PAL system? 10
(b) What is EIA test pattern? Draw and explain EIA pattern with utility. 10
5. (a) Draw and explain vidicon camera tube what is meant by dark current in vidicon? 10
(b) List the important equipments needed for troubleshooting a TV receiver. Suggest the common procedure to be followed while troubleshooting a TV receiver. 10
6. (a) Draw neat diagram to indicate sync separate section in TV system and explain it. 10
(b) With the help of neat diagram explain the functioning of cable television. 10
7. Write short notes on:— 20
 - (a) Interlaced scanning
 - (b) HDTV
 - (c) AGC
 - (d) Multicasting