43 : 2nd half.11-AM(f)
Con. 6885-11.

MP-3562

(3 Hours)

[Total Marks : 100

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

(2) Solve any **four** questions from Question Nos. **4** to **7**.

(3) Assume suitable **data** if **necessary**.

1. (a) Explain Recording Electrodes.   **20**
   (b) Explain Electronic Spirometer.
   (c) Explain Pulse Oximeter.
   (d) Explain Computer Tomography.

2. (a) Write in brief Man-Instrument System.   **12**
   (b) How action Potential generated ?   **8**

3. Write short notes on the following :—   **20**
   (a) Electro-myogram
   (b) Electro cardiogram
   (c) Electro retinogram.

4. (a) Explain Electroencephalograph (EEG).   **10**
   (b) Explain measurement of blood pressure and blood flow.   **10**

5. Write short notes on the following :—   **20**
   (a) Ventilators
   (b) Short Wave Diathermy
   (c) Ultrasound therapy unit.

6. (a) Explain Magnetic Resonance Imaging.   **10**
   (b) Explain Positron Emission Tomography.   **10**

7. (a) Explain Hospital Management System.   **10**
   (b) Explain Electrical Safety Codes and Standards.   **10**

230 : 2ndHf11C.mk

Con. 6482-11.

MP-3542

(3 Hours)

[Total Marks : 100

N.B. (1) Question No. **1** is **compulsory**.
    (2) Attempt any **four** out of remaining **six** questions.
    (3) Assume any **suitable** data wherever **required**.
    (4) Draw neat **diagrams** and **sketches** wherever **required**.

1. (a) Explain any five characteristics of instrument.   5
   (b) Explain classification of transducer.   5
   (c) What are advantages of active filter over passive filter ? Also draw active filter   5
      circuit and explain its operation.
   (d) Explain composite controller with one example.   5

2. (a) Derive an expression for unit step response of second order system.   10
   (b) Explain in detail inductive transducer along with primary transducer to measure   10
      air pressure.

3. (a) Explain bonded and unbonded strain gauges with neat diagrams. What are the   10
      advantages of semiconductor strain gauge ?
   (b) Explain thermocouple with respect to following :—   10
        (i) Temperature range
        (ii) Material used
        (iii) Linearity, non-linearity
        (iv) Cold junction compensation
        (v) Thermopiles.

4. (a) Explain window detector for any one industrial application.   10
   (b) What is need of logarithmic amplifier ? Also explain logarithmic amplifier with   10
      neat circuit diagram in detail.

5. (a) Explain multichannel data acquisition system to measure and display humidity,   12
      pH, liquid level, temperature and pressure.
   (b) What is need of data logger ? Explain its operation, advantages, disadvantages   8
      with neat block diagram.

6. (a) Explain P, PI, PD, PID electronics controller with neat circuit diagram, expression   12
      and applications.
   (b) Compare Continuous and Discontinuous Controller. Explain discontinuous   8
      controller with one application.

7. (a) What is need of Instrument Calibration ? Explain preparation for calibration also   12
      explain standard calibration procedure.
   (b) Write a note on Distributed Control System.   8

Con. 6117-11.   **MP-3547**

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

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

(2) Solve any **four** from remaining **six** questions.

(3) Assume suitable **data** wherever required but **justify** it.

(4) **Figures** to the **right** indicate **full** marks.

1. Solve the following :—   **20**

(a) How are waveguides different from the normal two wire transmission lines ? Discuss the similarities and dissimilarities. .

(b) Write a note on reentrant cavities and show that it supports infinite modes.

(c) How are Microwave measurements different from low frequency measurements ?

(d) What are applications of Microwaves ?

2. (a) What are slow wave structures ? Explain how a helical TWT achieves amplification. **10**

(b) Derive wave equation for TE wave and obtain all the field components in a circular **10** waveguide.

3. (a) Explain the action of isolator, gyrator and circulator using ferrites, mention their **10** typical applications.

(b) Explain Gunn effect using the two valley theory. Describe the several donation **10** formation modes of Gunn diode. Mention the typical characteristics and applications of Gunn diode.

4. (a) A reflex Klystron operates under the following conditions.   **10**

$V_0 = 600$ V, $L = 1$ mm, $R_{sh} = 15$ KΩ,

$\dfrac{e}{m} = 1 \cdot 759 \times 10^{11}$ (MKS system); fr = 9 GHz.

The tube is oscillating at "fr" at the peak of the n = 2 mode or $1 \cdot \dfrac{3}{4}$ mode. Assume

that the transit time through the gap and beam loading can be neglected.

(i) Find the value of the repeller voltage Vr.

(ii) Find the direct current necessary to give a Microwave gap voltage of 200 V.

(iii) What is the electronic efficiency under this condition ?

(b) What do you understand by the terms cut-off wavelength, dominant mode, guide **10** wavelengths, phase velocity, group velocity and wave impedance, obtain the mathematical relations for each one of these and their interrelationships.

[TURN OVER

5.   (a) An air filled rectangular waveguide of inside dimensions 7×3.5 cm operates in   **10**
        the dominant TE_{10} mode.
          (i) Find the cut-off frequency.
         (ii) Determine the phase velocity of the wave in the guide at a frequency of
             3.5 GHz.
         (iii) Determine the guided wavelength at the same frequency.
    (b) Explain the operation of H-plane and E-plane Tee's and derive the scattering matrix   **10**
        for these Tee's.

6.   (a) A TWT operates under the following parameters —   **10**
        Beam voltage $V_0 = 3$ kV.
        Beam current $I_0 = 30$ mA.
        Characteristic impedance of helix : $Z_0 = 10 \, \Omega$
        Circuit length N = 50.
        Frequency f = 10 GHz.
        Determine (i) the gain parameter (ii) the output power gain A_p in decibels and
        (iii) all four propogation constants.
    (b) Explain the methods used for power measurement in Microwave.   **10**

7.   Write short notes on the following :—   **20**
        (a) IMPATT Diode and TRAPATT diode
        (b) Waveguide attenuators
        (c) Measurement of VSWR.

TE ETRX -Sem -VI
MPMC -II

Con. 6185-11.

MP–3553

(3 Hours)

[Total Marks : 100

NB.

1. Question no. 1 is compulsory.

2. Out of remaining questions, attempt any four questions.

3. In all five questions to be attempted.

4. Figure in bracket indicate full marks.

Q1. A) Distinguish between BIU and EU of 8086. (5M)

B) Explain pipelining in PIC18F. (5M)

C) List and explain process control instructions. (5M)

D) Explain control word for 8255 PPI. (5M)

Q2. A) Explain the role of 8288 bus controller in maximum mode of 8086. 10M

B) Draw timing diagram for minimum mode of 8086. 10M

 i) Read bus cycle   ii) Write bus cycle

Q3. A) Explain the following 8086 instructions. 10M

 a) AAS b) SHL c) JCXZ d) CLC e) MOVS

B) Write a program to sort ten numbers in ascending order using 8086. 10M

Q4. A) Explain different ways in which parameters are passed to the procedure. 10M

B) Write a program to create a delay of 100ms. The program is to be run on a PIC 18F 10M

controller clocked by 40 MHz crystal oscillator.

Q5. A) What are the different functional blocks of 8259? Explain its initialization process. 10M

B) What are handshaking signals? Explain the need for handshaking signals. Explain the 10M

various modes of 8255 PPI with handshaking signals.

Q6. A) Explain different addressing modes of PIC 18F controller. 10M

B) Explain logic and rotate instructions of PIC 18F controller. 10M

Q7. Write short note on :

A) Mixed language programming.(7M)
B) Interface of 8086-8087.(7M)
C) Modes of DMA transfer.(6M)

****

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

(2) Attempt any **four** questions out of remaining **six** questions.

(3) Figures to the **right** indicate **full** marks.

(4) Assumptions made should be **clearly** stated.

(5) Assume any **suitable** data whenever required but justify the **same**.

1. (a) Find the number of complex addition and complex multiplication required **20** to find DFT for 16 point signal. Compare them with the no. of computation required if FFT algo is used.

(b) Test the following signals for linearity and time variance/invariance.

   (i) $y(n) = x(n) \cdot x(n)$.

   (ii) $y(n) = n\, x(n)$.

   (iii) $y(n) = x(2n)$.

   (iv) $y(n) = x(n-2)$.

   (v) $y(n) = e^{x(n)} \cdot x(n)$.

(c) By giving analysis and synthesis equation for DTFT, DFT and z-transform. Describe it, with the help of physical interpretation.

(d) Determine whether or not each of the following signals is periodic. If a signal is periodic, specify its period.

   (i) $x(n) = e^{j6\pi n}$

   (ii) $x(n) = e^{\sqrt{\frac{3}{5}}\left(n+\frac{1}{2}\right)}$

   (iii) $x(n) = \cos\left(\dfrac{2\pi}{3}\right)^{n}$

[TURN OVER

2. (a) Determine the inverse z-transform for the following x(z) by Partial Fraction   **10**
Expansion Method.

$$x(z) = \frac{z+2}{2z^2 - 7z + 3}$$

if Roc's are   (i) $|z| > 3$

(ii) $|z| < \frac{1}{2}$

(iii) $\frac{1}{2} < z < 3$

(b) Find the Z-transform of the sequences x(n) = u(n) – u(n–8) and sample it   **10**
at 6 points on the unity circle, using the relation

$$x(k) = x(z)\big|_{z = e^{j2\pi k/6}} ; k = 0,1.....5.$$

Find the inverse DFT of x (k) and compare it with x(n) and give comments.

3. (a) Show cascade and parallel realization for   **10**

$$H(z) = \frac{1 - \frac{1}{2}z^{-1}}{1 - z^{-1} + \frac{3}{10}z^{-2}}$$

(b) Identify the following filter based on its Pass Band by sketching its frequency   **10**
response.

h (n) = { 1, -½ }

4. (a) Let x(n) be a real valued sequences of length 'N' and let x(k) be its DFT   **10**
with real and imaginary part $x_R(k)$ and $x_I(k)$ respectively. Show that
if x(n) is real $x_R(k) = x_R(N-k)$ and $X_I(k) = X_I(N-k)$ for k = 1.... (N–1).

(b) Consider the length 8 – sequence defined for $0 \le n \le 8$.   **10**

x (n) = { 1, 2, –3, 0, 1, –1, 4, 2 }.

with a 8-point DFT. Evaluate the following function x(k) without computing DFT.

(i)   x(0)   (ii) x(4)   (iii) $\displaystyle\sum_{k=0}^{7} x(k)$ (iv) $\displaystyle\sum_{k=0}^{7} |x(k)|^2$

5. (a) Using overlap and save technique, perform convolution of   **10**
   x(n) = { 1, 2, 3, 4, 5, 6, 7, 8 }
   h(n) = { 1, ½ }

   (b) Using DFT / IDFT method, find response of the system with impulse response.   **10**
   h(n) = 2δ (n) +   5δ (n)   if the input to the system is
   x(n) = 2δ (n) +   3δ (n–1) + 5δ (n–2).

6. (a) With the help of neat block diagram explain any one DSP processor in detail.   **7**
   (b) Write short notes on system classification.   **3**
   (c) Compare IIR and FIR system.   **4**
   (d) State sampling theorem and explain the following term :   **6**
       (i)   Nyquist frequency
       (ii)   Nyquist rate
       (iii)   Folding frequency
       (iv)   Sampling frequency.

7. (a) Derive the composite radin for 6 = 2·3 algorithm and draw the flow graph.   **10**
   (b) The T.F. of a DTS has poles at z = 0·5, z = 0·1 ± j 0·2 and zeros at z = –1   **10**
   and z = 1.
       (i)   Sketch the pole zero diagram for the system.
       (ii)   Derive the system Transfer function H(z) from pole-zero diagram.
       (iii)   Develop the difference equation
       (iv)   Find if the system is stable.

20/12/11

87: 2nd Half-Exam.-11 mina (d).

Con. 6930-11.

TE ETRX Sem-VI (R)
Power Electronics
MP-3544

(3 Hours) [Total Marks : 100

N. B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions out of remaining **six** questions.
(3) **All** questions carry **equal** marks i.e. **20**.
(4) Assume **suitable** data if any.

1. (a) 100 V. d.c. source, a thyristor and R-L load is connected in series. R = 20 Ω and **20** L = 0·5 H. Latching current of thyristor is 50 mA. Duration of the firing gate pulse is 50 μ sec. Will the thyristor get fired ? Justify your answer.

 (b) Explain simple resistance triggering circuit to turn on SCR. Comment about the disadvantages of the circuit.

 (c) Explain natural commutation and forced commutation of SCR. Differentiate between them.

 (d) A 230 V, 1 φ a.c. voltage supply with 50 Hz frequency delivers power to load R = 10 Ω through a halfwave controlled rectifier circuit. If α i.e. firing angle is 60° find rectification efficiency.

2. (a) Draw and explain circuit diagram and working of single phase, full wave, bridge **10** controlled rectifier. Draw related waveforms. Derive equation for average value of output voltage V_0 and rms value of output voltage.

 (b) A single phase semiconverter, connected to 230 V., 50 Hz source, is feeding a **10** load R = 10 Ω in series with a large inductor which makes the load current ripple free. Firing angle is 45°. Calculate following performance parameters of this converter :—
 (i) Rectification efficiency
 (ii) rms value of fundament current ISI (source)
 (iii) Displacement Factor (DF)
 (iv) Current Distortion Factor (CDF)
 (v) Total Harmonic Distortion (THD).

3. (a) Draw and explain circuit diagram for the synchronized UJT triggering. Also **10** draw and explain the associated waveforms. How triggering angle is decided by above circuit ?

 (b) Explain class C commutation i.e. complementary commutation of SCR. Draw related **10** waveforms i.e. voltage across capacitor, thyristor voltage, thyristor current and current through capacitor v/s time.

4. (a) In a class D commutation circuit supply voltage V_s = 230 V and L = 20 μH and **10** C = 40 μF. If constant, ripple free load current of 120 A is assumed then calculate :—
 (i) Peak value of current through capacitor and also through main and auxilliary thyristor.
 (ii) Circuit turn off times for main of auxilliary thyristor.

 (b) Explain need, circuit diagram and working of inverse cosine scheme for triggering **10** a full inverter.

[TURN OVER

5. (a) Draw only and name properly the circuit symbol and I-V characteristics of TRIAC, 10
       IGBT and GTO.

   (b) Explain the following terms related to thyristor with practical values :—   10

       (i) $\frac{dv}{dt}$ rating

       (ii) $\frac{di}{dt}$ rating

       (iii) Holding current
       (iv) Turn off time.

6. (a) What is the need of Snubber Circuit in thyristor ? How the components of snubber 10
       circuit are designed ?

   (b) Draw and explain working of three phase half-wave controlled rectifier with 'R' 10
       Load or 3 phase, 3 pulse converter. Draw input and output voltage and mark
       $\alpha = 0°$ for each thyristor i.e. natural angle of conduction on the waveform.

7. Write short notes (any three) :—
   (a) Microprocessor based Triggering Circuit.   20
   (b) Soft Start Circuit.
   (c) Isolation Circuits using Optocoupler and Pulse Transformer.
   (d) Series and Parallel Connections of SCRs.

Con. 6884-11.   **MP-3556**

(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 any **data** wherever required but **justify** the **same**.
   (4) **Figures** to the **right** indicate **full** marks.

1. (a) Compare Paging and Segmentation in brief.   5
   (b) Explain different multiprocessor system configuration.   5
   (c) Explain restoring division algorithm and draw its flowchart.   5
   (d) Explain the register structure of IA32 family.   5

2. (a) Explain the concept of cache memory with reference to the principle of locality   10
       of reference, hit ratio and different cache architectures.
   (b) What is virtual memory ? Explain how paging is useful in implementing virtual   10
       memory.

3. (a) What is bus contention ? How it is resolved by using bus arbitration ?   10
   (b) Draw a block schematic of micro programmed control unit and explain in brief. 10
       Explain various methods of micro program sequencing.

4. (a) Explain various DMA transfer modes in brief with diagrams.   10
   (b) Explain various steps taken by CPU in interrupt processing. Explain how multiple 10
       devices share a single interrupt line.

5. (a) What are different I/O access methods ? Explain in detail.   10
   (b) Difference between DRAM and SRAM cell. Draw basic diagram for DRAM cell 10
       and explain its read and write operation in detail.

6. (a) Explain different addressing modes of Pentium processor with suitable example. 10
   (b) What is pipelining ? Show the suitable example with 5 stage pipelined architecture. 10

7. Write short notes on (any **three**) :—   20
      (a) Booth's Multiplication
      (b) Floating point format.
      (c) Various characteristics of memory.
      (d) Hazards in pipelined architecture.

Con. 6887-11.   **MP-3559.**

(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 if **required**.
(4) **Figures** to the **right** indicates **full** marks.

1. (a) What is meant by driven element and parasitic element explain with diagram.   20
   (b) Explain the importance of equalising pulses in the composite video signal of a TV system.
   (c) Explain orbital mechanics of satellite with the help of Kepler's laws.
   (d) What are some of the ways of jamming or confusing energy radar.

2. (a) With a neat block diagram explain the working of PAL encoder and decoder.   10
   (b) With working principle and block diagram explain digital TV and HDTV.   10

3. (a) What is Look angles ? Explain the geometry used in determining the look angles for a geostationary satellite.   10
   (b) Derive the satellite system link equations for receiver power.   10

4. (a) Explain the following terms with respect to antenna :–   10
       (i) Radiation Resistance
       (ii) Effective length
       (iii) Effective Area (Aperture)
       (iv) Beamwidth
       (v) Polarization.
   (b) What is Antenna array ? Explain Broad side array and end fire array in detail.   10

5. (a) Give classification of optical fibres by considering stepped index and Graded index monomode and multimode fibres.   10
   (b) What is the criteria for selection of a cable for a particular application ?   6
   (c) What is the criteria for selecting a strength member ?   4

6. (a) What are the Antenna scanning and tracking system implemented in Radar ? Explain these system briefly with diagram and also compare them.   10
   (b) Explain the doppler effect with respect to radar and derive equation of it mathematically.   5
   (c) Explain basic principle of radar, system. Hence explain, unit of distance, PRF, PRT, pulse width and receive time.   5

7. Write short notes :–   20
       (a) LCD TV
       (b) Satellite Launching
       (c) Direct broad cast satellite
       (d) Microwave Antennas.