

Con. 3800-11.

(REVISED COURSE)

RK-2612

(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 but justify the same.

1. a. Explain depolarization and re-polarization taking place in human cell. 20
Explain Na-K pump action
b. Explain Einthoven triangle to determine the cardiac output in Bipolar electrode lead system of recording of ECG.
c. Explain the significance of sa node in case of cardiac cycle
d. Differentiate between invasive and noninvasive techniques pertaining to Blood Pressure monitoring.
e. State what you mean by systolic and diastolic in case of Blood pressure measurement.
2. a. Draw neat sketches of different kinds of electrodes used in 10
biomedical instrumentation and explain the use of each type. Why are electrolytes used with electrodes?
b. Explain the working of three op-amps Instrumentation Amplifier. Derive the relationship for gain. Explain the need of signal 10
conditioners in biomedical instrumentation?
3. a. Explain all 12-lead configurations in case of Electrocardiograph, with 10
the help of neat diagram show how the measurement is carried out?
b. Differentiate between two electrodes and four electrodes electrical 10
impedance type plethysmograph. Also explain the working.
4. a. Explain the working of finger tip oximetry . 10
b. Explain generation of EEG signal. With neat sketches show different 10
waves generated. Draw the block diagram and explain each block.

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5. a. Explain the working of Ventilator Explain how different parameters are monitored? 10
- b. Give basic block diagram of CT scanner. Explain four basic subsystem of computer Tomography. 10
6. a. Draw the block diagram of Electro-surgical unit and explain different modes of operations. 10
- b. What is Hemodialysis? Explain the working with neat block diagram. What are the difficulties in carrying on dialysis? 10
7. Write a short note on (any three): 20
- a. Driven -Right leg system in Electrocardiograph.
- b. Rate Responsive Pacemaker.
- c. Physiology of respiratory system.
- d. Telemetry in Bio-physical measurement
- e. Electromyography
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Con. 3242-11.

(REVISED COURSE)

RK-2625

(3 Hours)

[Total Marks : 100

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

1. (a) What is bus Arbitration ? 5
 (b) What is meant by TLB ? 5
 (c) Write Algorithm for multiplication. 5
 (d) Microprogram for $R_1 + R_2 \rightarrow R_3$. 5

2. (a) With the help of dual bus structure explain how Data will be Read from memory. The address where Data is present in the memory is in register R_1 . The opcode is available in register R_2 . 20
 (b) Give the special features of super scalar Architecture.

3. (a) Explain different types of hazards. 20
 (b) Explain how virtual memory concept is implemented between secondary memory, main memory, cache memory and CPU.

4. (a) For five instructions show how four stage pipe line will work. Give the number of 7 states for pipeline and nonpipeline mode. 20
 (b) Explain cache Architecture in detail.

5. (a) Explain ARM family Architecture. 20
 (b) Draw and explain the working of magnetic hard disk.

6. (a) Explain different types of buses used in computer communication. 20
 (b) Explain Addressing modes of intel 32 Architecture.

7. Write short notes on any **two** :— 20
 - (a) Hardwired Control Unit.
 - (b) Cache replacement policies
 - (c) Logical instructions of ARM.

18/6/2011

Jathair-11-SG 11-(C)

T.E ETRX VT (Rev)
Elective I - Commuⁿ systems
App.

Con. 3064-11.

(REVISED COURSE)

RK-2619

(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** indicate **full** marks.

1. Attempt any **four** questions :— 20
- (a) Explain interlaced scanning with block diagram.
 - (b) Give applications of LEO, MEO and GEO satellites.
 - (c) What is Doppler Effect ? How is it made use of in radar ?
 - (d) Find the length of a half wave dipole at 0.06 GHZ, 0.6 GHZ and 6 GHZ.
 - (e) Explain different fiber losses.
2. (a) Define and explain the terms :— 10
- (i) Apogee (ii) Perigee (iii) Ascending Node
 - (iv) Descending Node (v) Major axis and Minor axis.
- (b) Explain clearly the working principles of various multiple communication systems (TDMA, FDMA and CDMA). 10
3. (a) Draw a composite video signal for atleast three successive lines and explain the different signal components present in it. 10
- (b) Explain PAL encoder and decoder with neat block diagram. 10
4. (a) Explain the difference between driven and parasitic elements in an antenna array. Describe Yagi Uda antenna and log periodic antenna with respect to their radiation pattern, dipole spacing, dipole lengths and applications along with the sketch. 10
- (b) What is UHF and Microwave antenna ? Explain parabolic reflector antenna with different types of feed. 10

5. (a) Explain pulsed dopper radar and MTI radar with neat block diagram. 10
(b) What are the radar performance factors ? 5
(c) Calculate the maximum range of a radar system, which operates at 4cm with a pick pulse power of 500 kW, if it's minimum receivable power is 10^{-13} W, the capture area of its antenna is 4 m^2 and the radar cross sectional area of the target is 20 m^2 5
6. (a) Explain different optical sources and optical detectors with suitable diagrams. 10
(b) Justify selection of 4.43 MHz as colour subcarrier frequency. 5
(c) What is half line discrepancy in TV system ? How it is overcome ? 5
7. Write short notes (any three) :— 20
(a) Kepler's Laws
(b) Plasma and LCD TV
(c) Look angles
(d) Antenna coupling.
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Con. 3021-11.

(REVISED COURSE)

RK-2616

(3 Hours)

[Total Marks : 100

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

1. Answer the following :—
- (a) What is half waving effect explain with waveforms. 5
 - (b) Write SOA rating of Power Mosfet. 5
 - (c) Compare SCR and IGBT 5
 - (d) Define $\frac{di}{dt}$ and $\frac{dv}{dt}$ rating what happens when these ratings are exceeded. 5
2. (a) Explain the full wave ac control using Triac and Diac. Draw waveforms. 10
(b) Draw construction of IGBT. Explain the same along with latch up in IGBT. 10
3. (a) Explain the operation of complementary commutation ckt. Draw the waveform across any one SCR and capacitor. 10
(b) A relaxation OSC using UJT is to be designed for SCR. 10
 $\eta = 0.71$ $I_p = 0.6 \text{ MA}$ $V_p = 16\text{V}$ $V_v = 1\text{V}$
 $I_v = 2.6 \text{ MA}$ $R_{BB} = 5.5 \text{ K}\Omega$ Normal leakage current with emitter open 4.2 MA .
The firing frequency. is 2 kHz $C = 0.04 \mu\text{F}$
4. (a) What is the problem with series connection of SCR, explain in detail and suggest protection ckt. 10
(b) Explain with the ckt diagram zero voltage switch. 10

5. (a) Define various performance parameters single phase bridge rectifier with RL load and derive the same. 10
- (b) Draw and explain 3 phase fully controlled rectifier with R load, draw various waveforms when $\alpha = 60^\circ$ 10
6. (a) If half wave controlled rectifier has purely resistive load of R and delay angle $\alpha = \pi/3$, determine :— 10
- (i) Rectification efficiency
 - (ii) FF
 - (iii) RF
 - (iv) TUF
 - (v) PIV of SCR.
- (b) Draw complete protection ckt. for SCR. Explain in detail. 10
7. Write short notes on :— 20
- (a) Soft Start Ckt
 - (b) SOA Rating of Power Transistor
 - (c) Inverse Cosine Control Triggering Ckt
 - (d) Gate Characteristics of SCR.
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Con. 3491-11.

(REVISED COURSE)

(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 required and justify it.

1. (a) Find the number of complex additions and complex multiplications required to find DFT for 16 point signal. Compare them with the number of computations required if FFT algorithm is used. 20

(b) Determine whether or not following signal is periodic.

$$x(n) = \cos\left(\frac{\pi}{3} \cdot n\right) + \sin\left(\frac{\pi}{3} \cdot n + \frac{1}{5}\right)$$

(c) A periodic function $x_p(n)$ having samples over one period is given below

$$x_p(n) = \{ 1, -4, 2, -6 \}$$

Find Z.T. of this periodic function.

(d) For the system $y(n) = \sum_{k=n_0}^n x(k)$

Examine Causal/Noncausal, Linear/Nonlinear, Static/Dynamic, Time Variant/ Time invariant classification.

(e) What is the need for DSP processor when high speed Pentium processors are available ?

2. (a) A Casual DT system has Transfer function $H(z)$ such that, it is a cascade connection of two systems $H_1(z)$ and $H_2(z)$. $H_1(z)$ has one pole at $Z = \frac{1}{5}$ and one zero at $z = \frac{1}{4}$.

$H_2(z)$ has one pole at $z = 0$ and zero at $z = \frac{-1}{3}$.

(i) Find T.F. of the system. 3

(ii) Find Difference equation of the system. 3

(iii) Find response of the system to i/p $x(n) = \left(\frac{-1}{3}\right)^n u(n)$. 3

(iv) Draw pole-zero diagram of the overall system and comment on stability. 3

(b) Develop DIT-FFT algorithm for $N = 6$ and draw the flow graph. 8

[TURN OVER

3. (a) Given the 8 point DFT of the sequence : 8
 $x(n) = 1, 0 \leq n \leq 3$
 $= 0, 4 \leq n \leq 7$
- (i) Find its DFT using D I F F T algorithm using this result $(X(k))$ and DFT property (Not otherwise) find DFT of $x_1(n)$ and $x_2(n)$. 8
- (ii) Where $x_1(n) = 1, \text{ for } n = 0$ 3
 $= 0, \text{ for } 1 \leq n \leq 4$
 $= 1, \text{ for } 5 \leq n \leq 7$ 3
- (iii) Where $x_2(n) = 0 \text{ for } 0 \leq n \leq 1$ 3
 $= 1 \text{ for } 2 \leq n \leq 5$
 $= 0 \text{ for } 6 \leq n \leq 7$

- (b) Perform convolution operation between given function in time domain if 6

$$x(n) = \begin{cases} (-2)^n & \text{for } n = 0, 1, 2, 3 \\ 0 & \text{otherwise} \end{cases}$$

and

$$h(n) = u(n) + u(n-1) - u(n-2) - u(n-3)$$

4. (a) A second order discrete time system is characterized by the difference equation. 12
 $y(n) - 0.1y(n-1) - 0.02y(n-2) = 2x(n) - x(n-1)$. Determine the O/p response when I/P $x(n) = u(n)$ and initial conditions are $y(-1) = -10, y(-2) = 5$.
- (b) Using DFT/IDFT method find the response of the system with impluse response $h(n) = 5 \delta(n) - 2 \delta(n-1)$, if the I/P to the system is $x(n) = 3u(n) - 2u(n-2) - u(n-3)$. 8

5. (a) Determine the Inverse Z.T. of $X(z)$ for all possible ROC conditions if :— 10

$$X(z) = \frac{(z+1)}{(2z^2 - 7z + 3)}$$

also comment on stability in each ROC condition.

- (b) Draw a block diagram TMS320C54XX series architecture and discuss its function and capabilities. 10

6. (a) State and prove convolution property of Z-Transform. 7
 (b) Describe minimum phase, maximum phase and mixed phase system with example. 6
 (c) Explain autocorrelation and crosscorrelation with example. Also state properties of autocorrelation. 7

7. (a) Discuss application of DSP to Biomedical area. 20
 (b) Derive the relationship between DTFT and Z.T.
 (c) Write short notes on DTFS and properties of DTFS.
 (d) Explain block convolution using overlap Add OR overlap save method.

4/6/2011

TE ETRX VT (Rev)
Electronic Instrumentation

Con. 3633-11

(REVISED COURSE)

RK-2622

(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 **required**.

(4) Illustrate answer with sketches wherever **required**.

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

1. (a) What are the characteristics of Instrument ? Explain any four characteristics. 5
(b) Explain classification of transducer. 5
(c) What is need of signal conditioning ? Explain D.C. signal conditioner with neat block diagram. 5
(d) Explain any one control valve and electric actuator. 5
2. (a) What are types of error ? Explain in detail. 10
(b) Explain capacitive transducer for displacement measurement. Derive its expression. State its advantages and disadvantages. 10
3. (a) Explain any one method of temperature measurement. Draw the diagram and explain advantages and disadvantages of the selected transducer. Write its output voltage equation. 10
(b) Explain strain gauge transducer. Derive its gauge factor. What are bounded and unbounded strain gauges and also explain advantages and disadvantages of semiconductor strain gauge. 10
4. (a) Explain window comparator with one industrial example. 10
(b) What are the advantages of instrumentation amplifier ? Explain three op-amp instrumentation amplifier. Derive its output voltage equation. 10
5. (a) Explain multichannel data acquisition system to monitor temperature, air pressure, flow, displacement measurement. 10
(b) Explain any one PC-based instrumentation system. 10
6. (a) What are the advantages of continuous controller ? Explain electronics P, PI, PID controller with neat diagram. Also write its output voltage equation. 10
(b) What is cascade controller ? Explain one example of cascade controller. 10
7. (a) What is need of Instrument calibration ? Explain five point calibration procedure. 8
(b) Write a note on Data logger. 6
(c) Explain generalised instrumentation system in short. 6

31/5/2011

T.E. ETRA VT (Rev)
Microprocessor & Microcontroller - II

83 1st Half-Exam -11 mina-(c)

Con. 3423-11.

(REVISED COURSE)

RK-2604

(3 Hours)

[Total Marks : 100

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

1. (a) Briefly describe the condition(s) which cause the 8086 to perform each of the following types of interrupts : 5
type0, type1, type2, type3, type4.
(b) Describe the use of CAS0, CAS2 and CAS2 lines in a system with a cascaded 8259 (A). 5
(c) For P18 explain the concept of pipelining instruction and advantages. 5
(d) How many registers are available as stack in PIC 18 microcontroller and what is the size of stack pointer ? 5
2. (a) Write a program to produces a packed BCD type from 2 ASCII-encoded digits. 10
(b) Write all addressing modes of 8086 with one example each and also state the types of instructions. 10
3. (a) Draw and explain interfacing of 8259 with 8086. 10
(b) Describe how the control bus signals are produced for an 8086 system operating in maximum mode. 10
4. (a) Draw and explain interfacing of 8087 with 8086. 10
(b) Define the term macro, what is advantage of writing a macro over a subroutine ? Explain with example. 10
5. (a) In PIC 18F programming model, what is the difference between W register and data registers ? Specify the size of program counter and its function. 10
(b) Specify the number of instructions in a PIC 18 and bit size of most instructions. 10
6. (a) Interface two common-anode seven segment LEDs to PORTB and PORTC of 18F microcontroller and write instructions to design an up-counter counting from 00 to 59 at the interval of 100 ms and display the count at two seven-segment LEDs. 10
(b) Write a note on PIC 18 Reset. 10

Con. 3160-11.

(REVISED COURSE)

RK-2610

(3 Hours)

[Total Marks : 100

- N. B. :** (1) Question No. 1 is **compulsory**.
 (2) Solve any **four** from **remaining** questions.
 (3) Assume **suitable** data wherever **required** but **justify** it.
 (4) **Figures** to the **right** indicate **full** marks.

1. Solve the following : 20
 What do you understand by the terms :-
 (a) Cutoff Wavelength
 (b) Phase Velocity
 (c) Dominant Mode
 (d) Wave Impedance ?
2. (a) What are the limitations of conventional tubes at microwave frequencies ? Explain how these limitations can be overcome. 10
 (b) What is velocity modulation ? How it is different than normal modulation ? Explain how velocity modulation is utilised in Klystron amplifier. 10
3. (a) What are the crossfield devices ? How does a magnetron sustain its oscillations using its crossfields ? Explain Pi mode for the same. 10
 (b) A 2 cavity Klystron amplifier has the following parameters : 10
 $V_0 = 1000 \text{ V}$; $R_0 = 40 \Omega$, $I_0 = 25 \text{ mA}$, $F = 3 \text{ GHz}$.
 Gap spacing in either cavity $d = 1 \text{ mm}$, $h = 4 \text{ cm}$, $R_{sh} = 30 \text{ k}\Omega$.
 (i) Find input gap voltage to give maximum voltage V_2 .
 (ii) Find the voltage gain neglecting the beam loading in the output cavity.
 (iii) Find efficiency of the amplifier.

4. (a) An air filled rectangular waveguide of inside dimension 7×3.5 cm operates in dominant mode : 10
- (i) Find cutoff frequency.
 - (ii) Determine phase velocity of wave in the guide at a frequency of 3.5 GHz.
 - (iii) Determine the guided wavelength at same frequency.
- (b) Derive wave equation for TM wave and obtain all the field components in rectangular waveguide. 10
5. (a) What are cavity resonators ? Derive the equations for resonant frequencies for a rectangular and circular cavity resonator. 10
- (b) Explain the operation of E-plane, H-plane and E-H plane T with their S-matrix. 10
6. (a) Describe in detail operation of 2-hole directional coupler. Calculate Coupling factor if power in primary waveguide is 72 m watt and power delivered to the directional coupler is 8 m watt. 10
- (b) Calculate the SWR of a X mission system operating at 10 GHz. Assume TE_{10} wave transmission inside a waveguide of dimensions $a = 4$ cm, $b = 2.5$ cm. The distance measured between twice minimum power points = 1 mm on a slotted line. 10
7. Write short notes on :— 10
- (a) Gunn diode
 - (b) Microwave transistors
 - (c) Faraday Rotation
 - (d) Measurement of microwave power.
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