OCTOBER 2009, APPLIED ELECTRONICS, PAPER 1

Ques 1 (A): Select correct alternative and rewrite the following sub question – (4 Marks)

a) Electro statically deflect CRT is used in _____.

(i) Computer monitor **(ii)** TV picture tube **(iii)** CRO **(iv)** RADAR

b) Working principle of light dependent resistor is based on _____.

(i) Photo emissive effect **(ii)** Photo conductive effect **(iii)** Photo voltaic effect **(iv)** None of the these

c) In frequency response curve, at cutoff frequency gain is _____ % of maximum gain.

(i) 0 **(ii)** 50 **(iii)** 70.7 **(iv)** None of these

d) For perfect amplitude modulation index M is equal to _____.

(i) One **(ii)** Greater than one **(iii)** Less than one **(iv)** Zero

Ques 1 (B): Attempt any TWO of the following – (6 Marks)

a) Draw basic block diagram of regulated power supply and explain function of each block.
b) Define the following terms for opamp: input bias current, CMRR.
c) With circuit diagram and relation for output frequency explain a stable multivibrator using IC555.

Ques 2 (A): Attempt any TWO of the following – (6 Marks)

a) The spot on CRT is shifted by 4cm when 10V DC is applied to its vertical input. Find maximum displacement of spot when 10V AC is applied.
b) List transducers used to measure temperature and explain active temperature transducer.
c) State and explain necessity of modulation (any three points).

Ques 2 (B): Attempt any ONE of the following – (4 Marks)

a) With circuit diagram explain use of zener diode as voltage regulator.
b) Explain opamp as zero reference and reference voltage comparator with the help of circuit diagrams.

Ques 3 (A): Attempt any TWO of the following – (6 Marks)

a) With diagram explain how CRO displays waveforms.
b) Draw block diagram of 3-terminal voltage regulator IC and explain function of each block.
c) With the help of circuit diagram and derivation explain opamp as inverting amplifier.

Ques 3 (B): Attempt any ONE of the following – (4 Marks)

a) Explain the following opamp applications: integrator, differentiator.
b) List different types of network topologies and explain two network topologies.

Ques 4 (A): Attempt any TWO of the following – (6 Marks)

a) Explain working of photo relay circuit using LDR.
b) With the help of diagram explain opamp as voltage follower.
c) A carrier wave of frequency 1810kHz and peak value of 60V is amplitude modulated by 2kHz audio wave of amplitude 30V. Determine modulation index and bandwidth of modulated signal.

Ques 4 (B): Attempt any ONE of the following – (4 Marks)

a) Draw block diagram of DMM and explain its working.
b) In a half wave rectifier using transformer, secondary voltage is 12V and load resistance is 100Ω. Then calculate DC voltage, DC current, peak AC voltage and PIV of the diode.

Ques 5 (A): Attempt any TWO of the following – (6 Marks)

a) Compare any three parameters in case of center tapped transformer full wave rectifier circuit and bridge rectifier circuit.
b) Explain concept of virtual ground in opamp.
c) Explain with circuit diagram the working of frequency shift keying generator using IC 555.

Ques 5 (B): Attempt any ONE of the following – (4 Marks)

a) Explain with diagram the use of CRO in measurement of: phase difference between two signals, unknown frequency.
b) What is amplitude modulation? State expression for modulated wave and draw waveform of modulated wave.

OR

Ques 5 (A): Attempt any TWO of the following – (6 Marks)

a) Explain I-V characteristics of zener diode with the help of circuit diagram.
b) What are the active and passive transducers? Give example of each.
c) In opamp inverting adder if R_1 = 1kΩ, R_2 = 2kΩ, R_3 = 3kΩ and R_f = 6kΩ, calculate output voltage for $V_1 = V_2 = V_3$ = 0.3V.

Ques 5 (B): Attempt any ONE of the following – (4 Marks)

a) Explain working of cellular radio phone with simple block diagram.
b) In an AMV if R_2 = 750Ω which is connected between pin-7 and pin-6 & pin-2, determine the value of resistor R_1 connected between pin-7 and positive line. Also determine the value of timing capacitor C, if output frequency is 1MHz and duty cycle of the circuit is 80%.