MARCH 2008, APPLIED ELECTRONICS, PAPER 1

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

a) An inductor filter cannot be used with _____ rectifier.

(i) Half wave (ii) Full wave (iii) Bridge (iv) None of the above

b) While sensing linear displacement a capacitor transducer makes use of _____.

(i) Change in the distance between the plates (ii) Variation in the coverage area of the plates (iii) Change in relative permittivity (iv) None of them

c) As the height of satellite orbit goes lower, the speed of satellite _____.

(i) Increases (ii) Decreases (iii) Remains the same (iv) None

d) When internal temperature of IC LM317 increases beyond 170°C, LM317 _____.

(i) Burns down (ii) Shuts itself off (iii) Functions normally (iv) None

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

a) Explain the Electrostatic focusing system used in CRT.
b) When 20V DC is applied to the vertical deflection plates of CRO, the spot moves 4cms away from the center. If 20V AC is applied what will be the displacement of the spot?
c) Explain why 'delay line' is used in CRO.

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

a) Explain the following terms used for a voltage regulator: line regulation, load regulation and ripple rejection.
b) In a bridge rectifier circuit, turns ratio of transformer used is 15:1. The primary is connected to 230V, 50 Hz mains supply. Assuming that ideal diodes are used, find DC voltage across the load and PIV rating of the diodes.
c) A zener voltage regulator is to be designed for output voltage of 10V. If the input voltage to the regulator is 24V, find the value of current limiting resistor. Given: Pz = 500mW.

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

a) Explain working of regenerative comparator i.e. Schmitt trigger using opamp.
b) Explain the drawbacks of RC and DC coupled amplifier.

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

a) Explain working of current to voltage converter circuit used in DMM.
b) Draw block diagram of regulated power supply. Explain working of each block in brief.
c) Explain necessity of dual power supply for op. amp.

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

a) Explain use of IC 555 as FSK generator.
b) For timer IC 555 connected in astable mode calculate: charging time, discharging time, output frequency, duty cycle. (Given: R_1 = 5kΩ, R_2 = 2kΩ, C = 20μF).

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

a) Explain working of integrator using opamp. Derive expression for its output voltage.
b) Draw circuit diagram of inverting adder using op-amp. Derive expression for its output voltage.
c) Explain how an opamp can be used as a buffer.

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

a) Explain how current limiting is achieved in a transistorized series regulator.
b) Explain working of: LC Filter and capacitor filter.

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

a) Explain the concept of serial and parallel communication. State applications of each.
b) An amplitude modulated sinusoidal waveform is displayed on CRO. The maximum voltage measured is 4.6V and minim voltage measured is 0.7V Calculate modulation index and percentage modulation.
c) Write a note on Ring and Bus topology used in computer network.

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

a) Explain following parameters of opamp: slew rate, input offset voltage, input bias current and input offset current.
b) Explain with the help of neat diagram, how a CRO displays waveforms.

OR

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

a) Write a short note on LDR.
b) Explain principle and working of a loudspeaker.
c) Explain principle and working of opto-coupler.

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

a) Explain fiber-optic communication system with the help of block diagram.
b) Compare between AM and FM.
