MARCH 2010, APPLIED ELECTRONICS, PAPER 1

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

a) In SMPS the transistor is used as _____.

(i)   An amplifier   **(ii)   An oscillator**   **(iii)   A switch**   **(iv)   A rectifier**

b) Pulse width of a MMV with R = 10kΩ and C = 0.22μF will be _____.

(i)   2.42ms   **(ii)   2.42μs**   **(iii)   2.42sec**   **(iv)   24.2ms**

c) In an electromagnetic spectrum, visible light ranges from _____.

(i)   4–7μm   **(ii)   0.4–0.7μm**   **(iii)   0.4–0.7mm**   **(iv)   0.4–0.7nm**

d) Piezoelectric transducer is _____ transducer.

(i)   Temperature   **(ii)   Pressure**   **(iii)   Photo**   **(iv)   Chemical**

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

a) Explain with neat circuit diagram the function of time base generator used in CRO.
b) What are the types of deflection systems used in CRT? Explain principle of any one.
c) State and explain function of any three front panel controls used in CRO.

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

a) Explain the following terms with reference to CRO: fluorescence, phosphorescence, aquadag coating.
b) Draw and explain functional block diagram of three terminal IC voltage regulator.
c) In half wave rectifier circuit, primary is connected to 230V AC. The turns ratio of transformer used is 10:1. Calculate output DC voltage, output DC current for a load of 2kΩ.

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

a) Draw block diagram of opamp and explain working of each block.
b) Explain Schmitt trigger with neat circuit diagram. Draw transfer curve and define hysteresis.

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

a) Draw a neat labeled diagram of CRT and explain.
b) In a zener regulator find series resistance, zener current, load current if Vin = 30V, Vz = 20V, total current in the circuit is 30mA.
c) With a neat circuit diagram explain opamp as subtractor and derive expression for the output voltage.

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

a) Explain working of FSK generator using IC 555.
b) In an AMV if R_1 = 5kΩ, R_2 = 3kΩ, C = 0.2μF, calculate on time, off time, percentage duty cycle and frequency of the circuit.

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

a) Explain working of inverting amplifier using opamp and derive expression for output voltage.
b) Find output voltage in an inverting adder if V_1 = 0.2V, V_2 = 0.5V, V_3 = 0.4V, R_1 = 1kΩ, R_2 = 2kΩ, R_3 = 5kΩ and R_f = 10kΩ.
c) With the help of neat labeled diagram explain construction and working of loudspeaker.

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

a) Explain series regulator with current limiting.
b) Draw and explain neat circuit diagram of a bridge rectifier. Also draw input output waveforms.

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

    a) What is modulation? Explain need of modulation.
    b) What is geostationary satellite? Explain use of satellite as relay station.
    c) Explain serial and parallel data communication systems.

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

    a) Explain opamp integrator and differentiator circuit. Also state expression for output voltage.
    b) Draw a neat diagram of function generator and explain function of each block.

OR

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

    a) Explain three factors to be considered while selecting a transducer for a particular application.
    b) Compare amplitude modulation with frequency modulation.
    c) Explain the following opamp parameters with suitable diagram: input offset current, input bias current, CMRR.

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

    a) List any four advantages of fiber optic cable over conventional electrical cables.
    b) Explain simplex and duplex communication systems with suitable example of each.

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