MARCH 2009, APPLIED ELECTRONICS, PAPER 1

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

a) In capacitive transducer, capacitance is varied by changing _____.

| (i) | Material of plates | (ii) | Distance between the plates | (iii) | Area of plates | (iv) | Specific resistance |

b) For IC 741, offset adjustment is provided between pin number _____.

| (i) | 2 and 3 | (ii) | 1 and 5 | (iii) | 1 and 8 | (iv) | 2 and 5 |

c) In astable multivibrator, using IC 555, the supply voltage is 15V, then the voltage at pin number 5 will be _____.

| (i) | 5V | (ii) | 15V | (iii) | 10V | (iv) | 7.5V |

d) In FAX machine _____ is used for scanning the document.

| (i) | LCD | (ii) | LDR | (iii) | CCD | (iv) | LASER |

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

a) Write a note on comparator. Explain with neat figure.
b) Explain the working of an opamp as a differentiator and derive the expression for output voltage.
c) With reference to opamp, explain the terms: frequency response, concept of virtual ground

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

a) What is modulation? Explain with waveforms the amplitude modulation.
b) With the help of circuit diagram explain the FSK modem.
c) A radio signal is frequency modulated at center frequency of 160MHz. If the modulating frequency is 5kHz and frequency deviation is 20kHz, calculate: carrier swing, modulation index.

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

a) Explain with circuit diagram transitorised series voltage regulator. State the expression for output voltage and disadvantages of series regulator.
b) In full wave rectifier, if primary of transformer is connected to 230V, 50Hz and secondary voltage is 12-0-12V, then calculate: output DC voltage, PIV of diode, output ripple frequency, load current if load resistance is 500Ω.

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

a) Explain piezoelectric transducer with neat labeled diagram.
b) Write a note on optocoupler.
c) With the help of block diagram explain the working of pulsed RADAR system.

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

a) Explain non inverting configuration of opamp and derive the expression for its gain. How it can be converted into buffer?
b) State any four applications of CRO. Explain any two.

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

a) Draw the block diagram of function generator. Describe the function of each block.
b) Explain with proper diagram: LC filter, RC filter.
c) Draw the block diagram of an opamp and explain the function of each block.

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

    a) Draw and explain fiber optic communication system.
    b) Write a note on serial and parallel data transmission system. State the application of each.

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

    a) Explain the function of delay line and blanking circuit in CRO.
    b) Draw the block diagram of DMM and explain the function of each block.
    c) State any four different front panel controls of CRO. Explain any two.

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

    a) In AMV circuit, if $R_1 = 2.4k\Omega$, $R_2 = 3.9k\Omega$ and C = 0.47µF, then calculate: Charging time, Discharging time and Free running frequency
    b) Draw a circuit diagram of a monostable multivibrator using IC 555 and explain its working.

OR

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

    a) Explain zener diode as a voltage regulator.
    b) State different types of 3–pin IC regulator. Explain any one of them.
    c) Draw basic circuit of SMPS and state the function of each part.

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

    a) In the circuit of Schmitt trigger, if $R_1 = 12k\Omega$, $R_2 = 2k\Omega$, Vi = 3Vpp sine wave, with saturation voltage = ±14V, then calculate: UTP, LTP, Hysteresis voltage and Feedback factor β.
    b) In an inverting adder, $V_1 = 0.1V$, $V_2 = 0.2V$, $V_3 = 0.6V$, $R_1 = 1k\Omega$, $R_2 = 2k\Omega$, $R_3 = 3k\Omega$. Then find Vo, if $R_f = 10k\Omega$. Also draw the circuit diagram with given values.

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