MARCH 2006, APPLIED ELECTRONICS, PAPER 1

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

a) In SMPS _____ feedback is used.

(i) Positive **(ii)** Negative **(iii)** Positive and negative **(iv)** None

b) If supply voltage to IC555 AMV is reduced to half, then its output frequency _____.

(i) Is double the original frequency **(ii)** Is half the original frequency **(iii)** Does not change **(iv)** Is two third the original frequency

c) If a Lissajou's pattern like 8 is obtained, then frequency to vertical input fy and frequency to horizontal input fx are related by the equation _____.

(i) fy = 2fx **(ii)** fx = 2fy **(iii)** fx = fy **(iv)** None of the above

d) The secondaries in L VDT have equal number of turns, but they are connected in _____.

(i) Parallel **(ii)** Series assisting **(iii)** Series opposition **(iv)** None of the above

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

a) In an OPAMP differentiator, feedback resistor is equal to 2 M and input capacitor is 3 F. Find output voltage is input voltage changes from 0.1 V to 0.6 V within 5 seconds.
b) Define amplitude modulation Give the expression for modulated output and draw waveform.
c) Draw the pin configuration and symbol of IC 741.

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

a) With neat circuit diagram, explain the working of sweep generator.
b) The turns ratio of a transformer used in a bridge rectifier is n1:n2 = 10:1. The primary is connected to the AC mains. Assuming ideal diodes, calculate the output voltage, and PIV rating of the diodes.
c) Explain the concept of virtual ground in OPAMP.

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

a) Draw the block diagram of cellular radio and explain function of each block in brief.
b) Explain the working of inverting OPAMP with neat circuit diagram and derive expression for its gain.

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

a) Draw and explain the I-V graph of zener diode.
b) State various frequency ranges in an electromagnetic spectrum.
c) Draw a circuit diagram of monostable multivibrator using IC 555 and explain its working.

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

a) Define common mode rejection ratio and slew rate for an OPAMP. Explain their effect on the performance of an OPAMP.
b) Explain with a neat figure, how CRO displays a waveform.

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

a) Explain Low CRO is used to measure AC and DC voltages.
b) Explain three factors to be considered for selection of transducer.
c) Draw the pin configuration of LM 317 and state the expression for its output voltage.

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

a) Explain the four characteristics of a regulated power supply.
b) Draw a neat block diagram of a fibre-optic communication system and explain its working.

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

a) Explain the working of an opto coupler with neat diagram.
b) In an inverting adder, calculate output voltage if input voltage is 500mV input resistor is 1kΩ and feedback resistance is ten times the input resistance.
c) List various communication networks and explain one.

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

a) Explain the working of function generator with neat block diagram.
b) Explain the working of a centre-tapped full wave rectifier with neat diagram and waveforms.

OR

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

a) Define active and passive transducers and give one example of each.
b) With the help of a neat circuit diagram, explain the working of a voltage follower using OPAMP.
c) Explain the use of satellite as a relay station with neat diagram.

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

a) With neat circuit diagram, derive the output expression for an OP AMP subtractor.
b) Explain with diagram and waveforms, working of LC filter for eliminating ripple.

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