

MARCH 2007, APPLIED ELECTRONICS, PAPER 1

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

- a) Fiber optical cable carries _____.
- (i) Electrical signal (ii) Light signal (iii) Sound signal (iv) Video signal
- b) In astable multivibrator, if charging time constant is equal to discharging time constant, then duty cycle is _____.
- (i) 100% (ii) 50% (iii) 63% (iv) 37%
- c) Opto-coupler is used to _____.
- (i) Couple the input and output circuits (ii) Match impedance of input and output circuits. (iii) Disconnect input and output circuits. (iv) None of the above.
- d) Average output of a bridge rectifier is _____.
- (i) V_p (ii) V_p / π (iii) $2V_p / \pi$ (iv) $V_p / 2$

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

- a) Why time base is required in CRO? Explain with neat diagram working of time base circuit.
- b) Explain the use of CRO for measurement of phase and frequency using Lissajou's figures.
- c) Explain working of digital multimeter with block diagram.

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

- a) Explain working of series inductor filter with wave form.
- b) In a zener regulator if source voltage is 25V $R_s = 470\Omega$, $R_L = 1.5k\Omega$, $V_z = 6.2V$, calculate the zener diode current and load current.
- c) The secondary voltage in full wave rectifier is 30V r.m.s. using ideal diodes, calculate DC load voltage, load current and PIV rating for the diodes, when $R_L = 330\Omega$.

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

- a) Explain following parameters of an opamp CMRR, frequency response for open loop and closed loop conditions.
- b) Explain working of op-amp as comparator in inverting and non-inverting mode.

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

- a) Draw neat labeled diagram of CRT and explain working of each electrode.
- b) Draw the circuit diagram of series pass transistor voltage regulator with feedback and explain its working.
- c) Find output voltage of non-inverting op-amp with input resistance $200k\Omega$, feedback resistance of $2M\Omega$ and input voltage is 10mV.

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

- a) Explain how IC 555 can be used as Pulse position modulator. (PPM).
- b) Calculate range of output voltage obtained with the diagram given below.

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

- a) Explain working of differentiator circuit using op-amp. Derive expression for output voltage.
- b) Explain working of op-amp as a subtractor. Derive expression for its output voltage.
- c) In an inverting op-amp, adder $R_1 = 2k\Omega$, $R_2 = 3k\Omega$, $R_3 = 4k\Omega$, calculate the output voltage if $V_1 = 1V$, $V_2 = 2V$ and $V_3 = 5V$ and $R_f = 10k\Omega$.

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

- a) Explain basic concept of SMPS. What are its advantages over conventional power supply?
- b) Explain working of bridge rectifier. State its advantages over half wave rectifier.

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

- a) Why modulation is necessary in communication systems?
- b) Explain the working of transponder with block diagram.
- c) Explain the working of piezo-electric transducer.

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

- a) Draw circuit diagram of op-amp as Schmitt trigger. Explain UTP, LTP and hysteresis.
- b) Draw block diagram of function generator and explain each block in brief.

OR

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

- a) Explain which factors should be considered while selecting a transducer.
- b) Explain working of LVDT.
- c) Explain Simplex and Duplex communication. State example of each.

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

- a) With the help of block diagram, explain facsimile.
- b) Explain the working of Pulsed Radar with the help of block diagram.
