

OCTOBER 2010, APPLIED ELECTRONICS, PAPER 1

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

- a) Sawtooth voltages are applied at _____ in CRO.
- (i) **x-deflection plates** (ii) Focusing anode (iii) y-deflection plates (iv) Control grid
- b) Maximum current supplied by a zener regulator depend on _____.
- (i) DC input voltage (ii) **Wattage of zener** (iii) Line frequency (iv) Breakdown voltage
- c) Output voltage of opamp changes from -12V to $+12\text{V}$ in $4\mu\text{s}$. Then slew rate is _____.
- (i) $3\text{V}/\mu\text{s}$ (ii) $24\text{V}/\mu\text{s}$ (iii) **$6\text{V}/\mu\text{s}$** (iv) $-6\text{V}/\mu\text{s}$
- d) Transistor in the timer functions as open switch if _____.
- (i) **RESET = 0** (ii) **Trigger < $1/3V_{cc}$** (iii) **Threshold = $2/3V_{cc}$** (iv) **Trigger > $1/3V_{cc}$**

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

- a) Explain working of linear variable differential transformer with figure.
- b) Draw block diagram showing basic elements of a communication system and explain function of each block.
- c) Find output voltage of a non inverting amplifier with $R_1 = 200\text{k}\Omega$, $R_f = 2\text{M}\Omega$ and $V_i = 10\text{mV}$.

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

- a) Explain working of time base generator using UJT.
- b) Write comparison between three types of rectifier circuits.
- c) Calculate range of output voltage in a 3-terminal voltage regulator using IC 317, if $R_1 = 250\Omega$ and $R_2 = (500\Omega + 4\text{k}\Omega \text{ variable})$.*

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

- a) Define the following terms of opamp: open loop gain, CMRR, input offset voltage, input bias current.
- b) An FM signal has a resting frequency of 110MHz and has highest frequency of 110.10MHz when modulated by a signal of frequency 10kHz . Then determine frequency deviation, carrier swing, modulation index and lowest frequency attained by FM wave.

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

- a) What are the advantages of DMM over analog multimeter?
- b) Explain use of opamp as an integrator.
- c) What is a transponder? Draw basic block diagram of a transponder.

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

- a) Explain: line regulation, load regulation, ripple rejection and output impedance.
- b) Explain use of opamp as inverting amplifier. When it is called unity gain inverting amplifier?

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

- a) Explain working of LC filter with circuit diagram and waveforms.
- b) Explain working of Schmitt trigger using opamp.
- c) Explain working of IC 555 as MMV.

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

- a) With the help of a block diagram explain the working of function generator.
- b) Draw block diagram showing basic elements of a fiber optic communication system. Explain function of each block in brief.

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

- a) Define a transducer. Explain active and passive transducer.
- b) Explain inverting summing approximately with the help of an opamp. Derive the equation for output voltage.
- c) Explain importance of modulation index in AM with figures.

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

- a) Draw block diagram of CRO and explain the function of each block.
- b) Explain working of voltage regulator using series pass transistor. Obtain the expression for its output voltage.

OR

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

- a) Explain use of opamp as subtractor.
- b) Why networking is necessary in communication system? Explain LAN.
- c) Show pin configuration of IC 741 and IC 555.

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

- a) Explain basic idea of switch mode power supply. State its advantages.
- b) Explain working of a loud speaker and gas sensor.

Note: The (*) indicates full credit. It means that the question was asked in wrong way or it was a misprint in the paper or enough data is not supplied.