Guessing Paper March 2022

Applied Electronics Paper-1

Time: 3 Hrs. Std. XII Electronics Marks: 50

Ques 1 A] Fill in the blanks by choosing the *correct* alternative –

a] The avarage dc voltage of BR is _____. **[1]**

1] 2π/Vp

2] 2Vp/π

3] Vp/π

4] 2Vp x π

b] When negative voltage on control grid is increased, _____ of screen drops. **[1]**

1] focus

2] brightness

3] color

4] None of the above

c] The opamp can amplify _____. **[1]**

1] dc singals only

2] ac signals only

3] ac/dc signals

4] weak dc signals only

d] _____ multivibrator is an oscillator. **[1]**

1] Bistable

2] Monostable

3] Astable

4] One-shot

B] Attempt any **TWO** of the following: **[6]**

a] Draw the block diagram of CRO and explain its function of each block.

b] In HWR, if transformer secondary AC voltage is $12V_{rms}$ and load resistance is 100Ω, then calculate V_{dc}, I_{dc}, V_p and PIV of the diode.

c] Explain the working of gas sensor with diagram.

Ques 2 A] Attempt any **TWO** of the following – **[6]**

a] Draw the circuit of inverting amplifier using opamp and derive its output equation.

b] What is RADAR? Explain how the distance of target is measured using RADAR.

c] In an IC 555 timer if R = 1MΩ and C = 100uF, find its time delay (T).

B] Attempt any **ONE** of the following – **[4]**

a] Explain any two types of applications of satellite in brief.

b] Draw block diagram of opamp and explain its working block–by–block.

Ques 3 : A] Attempt any **TWO** of the following - **[6]**

a] Find the output voltage for an inverting adder, if $R_1 = R_2 = R_3 = 2k\Omega$ and $R_f = 10k\Omega$, with input voltages are –1V, 3V and 7V.

b] Draw the block diagram of digital multimeter and explain its working.

c] Explain with the help of suitable diagram principle working of cellular radio system.

B] Attempt any **ONE** of the following – **[4]**

a] Explain the use of CRO in (a) AC voltage measurement (b) DC current measurement.

b] A FWR is connected to a transformer of turns ratio 50:15. Find its average DC voltage (V_{dc}), PIV and ripple frequency, if input voltage is $200V_{rms}$ AC, 50Hz.

Ques 4 A] Attempt any **TWO** of the following – **[6]**

a] Draw circuit diagram of two transistors regulator circuit and explain its working.

b] Explain piezo electric transducer in brief.

c] Draw circuit diagram of inverting integrator and derive its output expression.

B] Attempt any **ONE** of the following – **[4]**

a] Draw block diagram of CRO and explain its working.

b] Derive the expression for amplitude modulated wave.

Ques 5 A] Attempt any **TWO** of the following – **[6]**

a] How opamp is used as a subtractor? Draw a circuit diagram for it.

b] Explain capacitive input filter circuit with diagram.

c] Draw pin diagram of IC 741 and state function of each pin.

B] Attempt any **ONE** of the following – **[4]**

a] What are the criteria to select a transducer for a system?

b] Explain the frequency response curve of an opamp with graph.

OR

Ques 5 A] Attempt any **TWO** of the following – **[6]**

a] What is half and full duplex communication system? Explain.

b] Draw block diagram of 3–terminal IC regulator circuit and explain its working.

c] Define the following –

a) Slew rate

b) Open loop gain

c) Closed loop gain

B] Attempt any **ONE** of the following – **[4]**

a] Draw block diagram of IC 555 and explain its working.

b] Compare the AM & FM processes with any four points.

The End

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Digital Electronics Paper-2

Time: 3 Hrs. Std. XII Electronics Marks: 50

Ques 1 : **A]** Select correct alternative and rewrite the sentence :

a] The property of flip-flop to hold the stored information is called _____. **[1]**

1] Resetting of flip-flop
2] Setting of flip-flop
3] Memory
4] None of these

b] The bubbled OR gate is equivalent to _____. **[1]**

1] NOT gate
2] NAND gate
3] AND gate
4] Ex-OR gate

c] A multiplexer circuit with 8 inputs will have _____ select inputs. **[1]**

1] Five
2] Three
3] Twenty four
4] None of these

d] A 48kHz clock signal can be reduced to 8kHz using _____ counter. **[1]**

1] MOD–14 counter
2] MOD–6 counter
3] MOD 10 counter
4] None of the above

B] Attempt any **TWO** of the following – **[6]**

a] Convert the following –

(a) $[1FD5]_{16} = [?]_2$ (b) $[1010101.011010010]_2 = [?]_{16}$ (c) $[27.F04]_{16} = [?]_{10}$

b] Calculate output state of 3–bit counter, when it receives 23rd clock pulse. Initially its output starts from 010.

c] Explain with circuit, how T–flip-flop can be used in reducing the clock frequency.

Ques 2 A] Attempt any **TWO** of the following – **[6]**

a] Explain concept of 1–bit memory cell.

b] Draw the block diagram of digital computer and explain its function.

c] In a circuit of 5–bit R–2R ladder find: (a) full scale output voltage (b) for input 10101, if 0 = 0V and 1 = 10V.

B] Attempt any **ONE** of the following – **[4]**

a] Design 4:1 multiplexer using two 2:1 multiplexer circuits and explain its working with diagram and truth table.

b] State and prove the De Morgan's both theorems.

Ques 3 : A] Attempt any **TWO** of the following – **[6]**

a] Explain the working of counter type ADC circuit.

b] Explain the working of a hard disk used in computers with diagram.

c] Draw the circuit of CMOS inverter and explain its working.

B] Attempt any **ONE** of the following – **[4]**

a] What is a demultiplexer? Design 1:4 Mux using gates and explain its working.

b] Implement the logic expression: f (A, B, C, D) = Σ_m (0, 1, 4, 5, 8, 6, 3, 11, 14) and draw necessary diagram also.

Ques 4: A] Attempt any **TWO** of the following – **[6]**

a] Draw the circuit of M/S flip-flop and explain its working.

b] Explain the working of ring counter with diagram.

c] What are decoders? Explain the working of BCD to decimal decoder.

B] Attempt any **ONE** of the following – **[4]**

a] Draw the circuit of asynchronous counter and explain its working with wave diagrams.

b] Draw the diagram of BCD to decimal decoder with NOT gate and AND gates and explain its working.

Ques 5 A] Attempt any **TWO** of the following – **[6]**

a] Discuss the working of Tri–state inverter circuit with diagram and truth table.

b] Write a short note on shift register.

c] Draw the circuit diagram of up-down counter and explain its working.

B] Attempt any **ONE** of the following – **[4]**

a] Define: fan out, figure of merit, power dissipation, propagation delay.

b] What is an Ex-OR gate? Thus, explain working of 4–bit controlled inverter.

OR

Ques 5 A] Attempt any **TWO** of the following – **[6]**

a] Explain method of converting fractional binary into decimal equivalent, with example.

b] What are codes? Explain in brief: ASCII and BCD code.

c] What is MOD of a counter? Explain with one example.

B] Attempt any **ONE** of the following - **[4]**

a] Compare TTL and CMOS logic circuits with any four points.

b] Draw the logic diagram for following logic expression –

$$\mathbf{Y = A\overline{B}\overline{C} + AA\overline{D} + C\overline{A}D + BAC}$$

The End