

Guessing Paper (2014-15)

Subject: Applied Electronics – 1

Time: 03 Hrs.

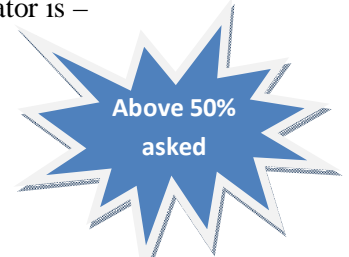
STD: XII

Marks: 50

Ques 1: A) Fill in the blanks by choosing the correct alternative –

(4)

- a) The emitter current of a transistor used as a series voltage regulator is –
- The same as zener current
 - The same as load current
 - The sum of above two currents
 - The difference of above two currents
- b) While sensing the linear displacement, a capacitive transducer makes use of –
- Change of distance between the plates
 - Variation in the coverage area of the plates
 - Change of relative permittivity
 - None of the above
- c) In _____ the amplitude of carrier signal change in accordance with intelligence.
- Amplitude modulation
 - Frequency modulation
 - Phase modulation
 - Frequency shift keying
- d) The frequency of pulse generated through the IC 555 depends upon –
- Built in components in the form of R and C
 - Discrete external components
 - Some other parameters actuate these pulses
 - None of the above



B) Attempt any TWO of the following –

(6)

- Explain how to use the CRO for measuring frequency by direct & Lissajou's method.
- Draw the diagram of function generator and explain the working of various blocks.
- Draw the diagram of DMM and explain its working for all possible conditions.

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

(6)

- Explain the terms for regulated power supply – LR, SR and RR.
- The turns ratio of the transformer used in BR is 10:1. The primary is connected to 220V, 50Hz power supply. Find the output DC voltage of BR under no load condition, assuming that the voltage drop across the diodes is zero.
- Design zener power supply, if $V_z = 25V/500mW$, $V_{in} = 40V$, find R_s if $R_L = 5\Omega$.

B) Attempt any ONE of the following –

(8)

- Explain the working of opamp as a differentiator and derive its output expression.
- Draw the basic circuit for a Schmitt trigger using opamp and explain its working.

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

- Explain the working of time base generator in CRO with suitable diagram.
- Explain the working of transistorized series pass voltage regulator using circuit.
- Define – input offset voltage, input bias current and CMRR of opamp.

B) Attempt any ONE of the following – (8)

- Draw the circuit of FSK using IC 555 and explain its working.
- What are the types of filters? Explain capacitor filter with circuit diagram.

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

- Draw the internal block diagram of opamp and explain its working.
- For a non-inverting amplifier, if $V_{in} = 3\text{mV}$, $R_f = 20\text{k}\Omega$, $R_1 = 15\text{k}\Omega$, then calculate V_o .
- Draw the circuit of opamp as adder, if $V_1 = 2\text{mV}$, $V_2 = 5\text{mV}$ & $V_3 = 7\text{mV}$, calculate V_o .

B) Attempt any ONE of the following – (8)

- Define modulation and explain its necessity in communication.
- Explain the function of transponder with its block diagram.

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

- Write a note on fax machine.
- What is LVDT? Explain in brief with necessary diagram.
- Explain magnetic deflection system in brief with suitable diagram.

B) Attempt any ONE of the following – (8)

- Define amplitude modulation and derive the equation for AM wave.
- What are simplex and duplex communication systems? Explain with examples.

OR

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

- In AMV using IC555, if $R_A = 10\text{k}\Omega$, $R_B = 100\text{k}\Omega$, $C = 0.1\mu\text{F}$ then calculate its frequency.
- Explain how the distance and height of the object can be determined with radar?
- Explain basic communication system using block diagram.

B) Attempt any ONE of the following – (8)

- What is a network? Explain tree topology in LAN with necessary block diagram.
- Draw the block diagram of CRO and explain function of each block.

The End

Guessing Paper (2014-15)

Subject: Digital Electronics – 2

Time: 03 Hrs.

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Ques 1: A) Fill in the blanks by choosing the correct alternative –

(4)

- a) The largest 4-bit binary number used in BCD code is _____.
- i) 1011
 - ii) 1111
 - iii) 1001
 - iv) 0001
- b) In tristate logic circuit the third state of the circuit is called as _____.
- i) HIGH impedance state
 - ii) LOW state
 - iii) HIGH state
 - iv) LOW impedance state
- c) A 32:1 Mux can be designed using _____ number of 2:1 Mux will be required.
- i) 12
 - ii) 8
 - iii) 16
 - iv) 32
- d) For a _____ gate, if $A = 1$, $B = C$, then $Y = \overline{C}$.
- i) Ex-OR gate
 - ii) NOT gate
 - iii) NOR gate
 - iv) NAND gate



B) Attempt any TWO of the following –

(6)

- a) Draw necessary diagram and write truth table for the following Boolean expression –

$$Y = \overline{(\overline{A.B} + \overline{A.B})} + \overline{A.B}$$

- b) Why NAND gate is called universal building block? Explain with basic gates and circuits.
c) Explain the concept of 1-bit memory cell.

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

(6)

- a) In 4-bit R-2R ladder if $0 = 0V$ & $1 = 12V$, find output voltage at 1011, 1101 and 0110.
b) What is encoder? Explain decimal to BCD encoder with necessary logic diagram.
c) Convert the following –
 $(7AB)_{16} = (?)_{10}$, $(1011\ 1000\ 0001)_{BCD} = (?)_{10}$, $(11011011101)_2 = (?)_{16}$.

B) Attempt any ONE of the following –

(8)

- a) Perform the following operations using 2's complement method. Use 8-bit representation of the numbers $(64)_{10} - (71)_{10} = (?)_2$.
b) Design 4:1 Mux using two 2:1 Mux with diagram and truth table.

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

- Explain the working of TTL NAND gate with suitable transistor diagram and truth table.
- What is a demux? Explain the working of 1:4 demux with circuit and truth table.
- Explain the double dabble method with one example.

B) Attempt any ONE of the following – (8)

- Explain the working of weighted resistor DAC. State its drawbacks.
- Explain any three characteristics of digital ICs.

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

- Prove that $\overline{\overline{A.B}} + \overline{A} + A.B = 0$ and $A + \overline{A.B} = A + B$
- The clock signal of frequency 10MHz is to be reduced to 1.25MHz. How it is possible using counter? Explain with a block diagram
- Explain the working of right shift register using flip-flops with diagram.

B) Attempt any ONE of the following – (8)

- Draw the circuit of MOD-10 counter and explain its working.
- Explain the working of BCD to 7-segment decoder using circuit diagram.

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

- State any three secondary memories. Explain read/write mechanism of magnetic tape.
- Explain the process of binary subtraction using 1's complement with any one example.
- Write a short note on BCD and ASCII code.

B) Attempt any ONE of the following – (8)

- Implement the following logic expression using Mux IC, which has inverted inputs such as IC 74150 –

$$f(A, B, C, D) = \sum m(2, 3, 6, 8, 9, 12, 14)$$

- Draw the circuit of clocked RS flip-flop and explain its working.

OR

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

- Explain SAR in A/D converter using diagram.
- Explain any three types of input devices used in computer.
- Calculate the output state of a 6-bit counter when it receives 122nd clock pulse. Initially its output starts from 000001.

B) Attempt any ONE of the following – (8)

- If three 'T' flip-flops are cascaded such that the output of one is the clock input of other and if the input clock frequency of first flip-flop is 400 kHz, then calculate the final output frequency. Draw the necessary block diagram also.
- Draw the block diagram of computer and explain function of each block.

The End