XII Electronics Guessing Paper-1: March 2024 Exam

Instructions

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat diagram wherever necessary.
4. Use of log-table is allowed.

Ques 1. (A) Select correct alternative and rewrite the sentence. (4 marks)

a) The full wave rectifier the PIV of each diode is greater than _____.
   i) 2Vp
   ii) Vp
   iii) Vp/2
   iv) 4Vp

b) If input voltages of an inverting adder are 1V, 2V and –3V; and if its input resistance is equal to feedback resistance, then its output voltage will be _____ volts.
   i) 6V
   ii) 12V
   iii) 2V
   iv) 0V

c) When a Lissajou's pattern of a circle is obtained on the screen, the phase difference between the two waves will be _____.
   i) 90° or 270°
   ii) 90° or 180°
   iii) 0° only
   iv) 45° or 135°

d) The modulation index in amplitude modulation is the ratio of _____.
   i) Vc to Vm
   ii) Vm to Vp
   iii) Vm to Vc
   iv) Vp to Vc

Ques 1. (B) Answer ANY TWO of the following. (6 marks)

a) Draw the block diagram of CRO and explain the function of each block in brief.
b) Calculate the average DC voltage and load current of an FWR circuit, if secondary voltage of transformer is 30V and RL= 9Ω. *(Ans: Vdc = 27V, IL = 3A)*
c) Draw the circuit of IC 555 as astable multivibrator and explain its working.

Ques 2. (A) Answer ANY TWO of the following. (6 marks)

a) Draw the neat labelled diagram of CRT used in CRO and explain its working in details.
b) Define the following:
    i) Open loop gain of an opamp
    ii) Slew rate of an Opamp
    iii) Virtual ground
c) Draw the circuit of differential amplifier and explain its working.

Ques 2. (B) Answer ANY ONE of the following. (4 marks)

a) What are the sidebands in AM? Explain the importance of AM communication system.
b) What are the ideal characteristics of Opamp? Give any six of them.

Ques 3. (A) Answer ANY TWO of the following. (6 marks)

a) Draw the circuit of voltage follower using Opamp and explain its working with derivation.
b) An audio signal is used to modulate a high frequency carrier wave v=25cos 628000000.t to produce amplitude modulation process. The modulating signal is v=10sin 31400.t. Then calculate the modulation index, percentage modulation, frequency of side bands, and bandwidth of the system.
(Ans: m=0.4, M=40%, USB=100.005MHz, LSB=99.995MHz, BW=10kHz)
c) Explain how Lissajou's pattern can be used in CRO to measure unknown frequency, with diagram.

Ques 3. (B) Answer ANY ONE of the following. (4 marks)

a) Explain the working of shunt zener regulator with neat diagram.
b) Draw the circuit of DMM and explain its working.

Ques 4. (A) Answer ANY TWO of the following. (6 marks)

a) Derive the output equation of subtractor using Opamp with neat circuit diagram.
b) Write a note on LDR. Explain its one application with neat diagram.
c) What is LVDT? Explain its working in details with neat diagram.

Ques 4. (B) Answer ANY ONE of the following. (4 marks)

a) Draw block diagram of function diagram and explain its working.
b) How optical fibre communication system works? Explain with neat diagram.

Ques 5. (A) Answer ANY TWO of the following. (6 marks)

a) Define the following:
   i) Phosphorescence for CRO
   ii) Amplitude modulation
   iii) Duty cycle for IC 555
b) Compare FM over AM with any three points.
c) Explain types of network topologies i.e. Star, Ring and Bus network with neat diagrams.

Ques 5. (B) Answer ANY ONE of the following. (4 marks)

a) Draw the circuit diagrams of T-type and π-type LC filters and explain their working in brief.
b) Draw the circuit of half wave rectifier with neat circuit diagram.

OR

Ques 5. (A) Answer ANY TWO of the following. (6 marks)

a) Define simplex and duplex communication systems.
b) Draw block diagram of a regulated power supply and explain its working.
c) What are the advantages of optical fibre communication system? Given any three.

Ques 5. (B) Answer ANY ONE of the following. (4 marks)

a) Explain basic concept of RADAR system with diagram.
b) Draw the circuit of IC 555 as FSK and explain its working.

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Chapter-wise Marks Scheme

1) Instruments – 15%
2) DC Power Supplies – 20%
3) Transducers – 10%
4) Operational Amplifiers – 25%
5) Modern Electronics Communication – 10%
6) Study of Integrated Circuits – 20%

XII Electronics Guessing Paper-2: March 2024 Exam

Instructions

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat diagram wherever necessary.
4. Use of log-table is allowed.

Ques 1. (A) Select correct alternative and rewrite the sentence. (4 marks)

a) ASCII code is _____ bit code.
   i) 8
   ii) 5
   iii) 7
   iv) 3
b) The 2's complement of a binary number is equal to _____.
   i) the 1's complement of its original number.
   ii) the 1's complement of original number – 1.
   iii) the original binary number.
   iv) the 1's complement of original number + 1.
c) In JK flip flop, the flip flip is _____, when clock pulse arrives.
   i) SET
   ii) RESET
   iii) TOGGLE
   iv) RECES
d) The method of converting decimal into binary is called as _____.
   i) Double-dooble
   ii) Dabble-double
   iii) Double-dabble
   iv) Double-double

Ques 1. (B) Answer ANY TWO of the following. (6 marks)

a) Convert: $(947)_{16} = (?)_{10}$ $(111)_{10} = (?)_2$ $(11101)_2 = (?)_{10}$.
b) Subtract using 2's complement method: $(11100)_2 - (1101)_2$ and $(1100)_2 - (11011)_2$
c) Explain the working of RS FLIP FLOP using NOR gates. Draw the neat diagram also.

Ques 2. (A) Answer ANY TWO of the following. (6 marks)

a) Compare Inclusive OR gate and Ex-OR gate with any three points.
b) Explain the working of 1:4 line demultiplexer with neat logic diagram and truth table.
c) Draw neat logic diagram of the logic equation: $Y = (A + B).(\overline{A + B})$

Ques 2. (B) Answer ANY ONE of the following. (4 marks)

a) Explain in brief different semiconductor memories using used in computer.
b) Explain the process of hex-dabble method with suitable example.

Ques 3. (A) Answer ANY TWO of the following. (6 marks)

a) Define the characteristics of digital ICs: propagation delay, noise margin, fan-out.
b) With the help of neat logic diagram, explain the working of TTL NAND gate.
c) Construct a combinational logic circuit using 16:1 line Mux by implementing the following expression:

$$f(A, B, C, D) = \Sigma_m(2,4,6,5,7,11,13,15)$$

Ques 3. (B) Answer ANY ONE of the following. (4 marks)

a) Explain the method to convert decimal numbers into hexadecimal number and convert (125.8)10 in to hexadecimal number. **Ans: (7D.CCCCC...)₁₆**
b) Implement the following multipoint combinational circuit using 4:16 line demultiplexer with active high outputs.

$$F_1 = \sum_m (0,1,4,8) \qquad F_2 = \sum_m (5,7,9,11,13) \qquad F_3 = \sum_m (8,10,12,15)$$

Ques 4. (A) Answer ANY TWO of the following. (6 marks)

a) Draw the block diagram of computer and explain the function of each block in it.
b) Simplify the following logic equation using Boolean laws and then draw logic diagram using basic gates for the simplified logic equation.
$$Y = A.B.C + \bar{A}.B.C + B.\bar{C}.D$$
c) Explain the working of CMOS NOT gate using MOSFETs. Draw neat circuit diagram also.

Ques 4. (B) Answer ANY ONE of the following. (4 marks)

a) Enlist any four output devices used in computer and explain any one of them in brief.
b) Draw the neat circuit diagram of 4-bit left shift register using D-flip flops and explain its working with wave diagram and truth table.

Ques 5. (A) Answer ANY TWO of the following. (6 marks)

a) Construct an Ex-OR gate using basic gates and explain its working in brief.
b) Fin the output voltage of 5-bit binary ladder circuit for inputs of 11101, 10101 and 11000, if logic-0 = 0V and logic-1 = +12V.
c) Explain the working of 3-bit up-down counter with neat circuit diagram.

Ques 5. (B) Answer ANY ONE of the following. (4 marks)

a) Draw the circuit of BCD to 7-segment decoder using IC 7447.
b) Explain the working of simultaneous ADC with neat circuit diagram.

OR

Ques 5. (A) Answer ANY TWO of the following. (6 marks)

a) Explain the working of master-slave JK flip flops with neat circuit diagram.
b) Explain in brief: MICR, Light pen and x-y plotter used in a computer system.
c) Prove that: $A + \bar{A}B = A + B$

Ques 5. (B) Answer ANY ONE of the following. (4 marks)

a) Draw the circuit of 8:1 line multiplexer and explain its working with truth table.
b) Define ASCII and EBCDIC code with brief details.

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Chapter-wise Marks Scheme

1) Number Systems – 15%
2) Logic Gates – 15%
3) Logic Families – 10%
4) Combinational Logic Circuits – 20%
5) Flip flops, Registers & Counters – 20%
6) ADC & DAC – 12%
7) Computer Fundamentals – 08%

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