| ELECTRONICS<br>PAPER - I (C-2)         Time : 3 Hours       4 Pages       Max. Marks : 5         actions : (1) All questions are compulsory.       (2) Draw neat labelled diagrams wherever necessary.         (3) Figures to the right indicate full marks.       (4) Use of log table is allowed.         (A) Select correct alternatives and rewrite the complete sentences :       (a) In CRO the Lissajour Figure Method can be used for measurem of  | 2017      | III :            | 20                 | 1100         | V               | 722                    |                    | E)                                       |
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| <ul> <li>of</li></ul>  | (a)       | In CRO           | ) the Lissa        | jour Figu    | re Method       | can be use             | d for meas         | surem                                    |
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| <ul> <li>(iii) IC-555</li> <li>(iv) None of these</li> <li>(c) The circuit of can be used to convert sine wave into squa wave.</li> <li>(i) Phase Changer</li> <li>(ii) Schmitt Trigger</li> </ul>   |           | (iii) 10         | 555                | 1 - 104      |                 | 11-1                   | a e Alex           | 1 10 10 10 10 10 10 10 10 10 10 10 10 10 |
| <ul> <li>(iv) None of these</li> <li>(c) The circuit of can be used to convert sine wave into squa wave.</li> <li>(i) Phase Changer</li> <li>(ii) Schmitt Trigger</li> </ul>   |           |                  |                    | •            |                 |                        | n in Balthing<br>A |  |
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| wave.<br>(i) Phase Changer<br>(ii) Schmitt Trigger   | (c)       | The circ         | cuit of            | can          | be used to      | convert sin            | ne wave into       | squa                                     |
| (i) Phase Changer<br>(ii) Schmitt Trigger  |           | wave.            |                    |              | 2. <sup>1</sup> |                        |                    | ÷. •                                     |
| (ii) Schmitt Trigger   |           | (i) Pl           | nase Chang         | ger          |                 | ·                      | i per a site       |  |
|  |           | (ii) So          | hmitt Trig         | ger          |                 |                        |                    |  |
|  |           | (iii) O          | scillator          | 1.1          | <u>,</u>        |                        |                    |  |

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(d) The minimum antenna height for Radio Wave Transmission is \_\_\_\_\_. 1

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- (i) λ/2
- (ii) 2/λ
- (iii)  $\lambda/4$
- (iv)  $4/\lambda$

(B) Answer any two of the following

- (a) State any three applications of CRO and explain any one of them.
- (b) State the ideal characteristics of Op-Amp. (Any six)
- (c) What are Sidebands in AM ? Explain its importance in AM Communication.
- 2. (A) Attempt any two of the following :

(a)



Calculate the DC Voltage across RL and current through it.

- (b) Explain any three factors for Selection of a Transducer.
- (c) Define Network Topology. Explain STAR Configuration and state its disadvantage.
- (B) Attempt any one of the following :
  - (a) Draw block diagram of CRO and explain the function of each block.
  - (b) Explain an Op-Amp Inverting Adder Circuit. Derive the equation for its output voltage.

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3. (A) Attempt any two of the following : Explain with circuit diagram, use of Op-Amp as a voltage follower. (a) A radio signal having carrier wave of 100 MHz, which is frequency (b) modulated by a 5 KHz audio tone causing frequency deviation of 15 KHz ? Calculate the carrier swing and modulation index. 3 (c) Explain the working of Monostable Timer Circuit using IC-555. 3 **(B)** Answer any one of the following : Explain with suitable diagram Electrostatic Deflection System. Define (a) Deflection Sensitivity of CRO. Explain the working of Zener Diode Voltage Regulator Circuit. (b) Answer any two of the following : 4. (A) State advantages of DMM Over Analog Multimeter. (Any Three) 3 (a) 3 Explain the following parameters of Op-Amp (b) Slew Rate (i) (ii) Open-loop Gain (iii) CMRR Explain with suitable diagram, the use of satellite as a relay station. 3 (c) Answer any one of the following : **(B)** Draw circuit diagram of astable multivibrator using. IC-555. (a) I<sub>c</sub> R<sub>A</sub> = 500 $\Omega$ , R<sub>B</sub> = 1.2 K $\Omega$  and C = 0.1 µF, then find its output frequency. -Vcc (b) Complete solution for your exam needs 9ΚΩ -VEE  $Vo = \pm 10V$ **≹**1KΩ

Calculate UTP and LTP voltages for above circuit.

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5. (A) Answer any two of the following :

(a) Explain the construction and working of Full Wave Rectifier Circuit using centre-tap transformer.

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- (b) Draw the Op-Amp differentiator circuit and derive the expression for its output voltage.
- (c) State any three advantages of fiber-optic cable over conventional electric cable.
- (B) Answer any one of the following :
  - (a) Write short note on :
    - (i) LDR
    - (ii) Thermistor
  - (b) Draw an Op-Amp inverting amplifier circuit. Explain the virtual ground concept and derive the expression for output voltage.

## OR

- 5. (A) Answer any two of the following :
  - (a) Explain with suitable diagram the working of Piezo-electric Transducer. 3
  - (b) Explain the concept of Cellular Phone. Draw block diagram of Cellular Radio Phone.
  - (c) Explain the FSK generator circuit by using IC-555.
  - (B) Answer any one of the following :
    - (a) Explain any four characteristics of regulated DC power supply.
    - (b) Draw block diagram of 3 pin IC-voltage regulator and explain the function of each block. State advantages of 3 pin regulator over discrete regulator circuit.

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- (c) In JK Flip-flop, when J=1 and K=1 the output voltage goes to
  - (i) Forbidden State
  - (ii) Last State
  - (iii) Toggle State
  - (iv) None of the above
- (d) In multiplexer the relation between Data Lines and m Select Lines

100 4.50

- is given by \_\_\_\_
- (i)  $2^{m} = n$
- (ii)  $2^{m-1} = n$
- (iii)  $2^{m+1} = n$
- (iv)  $2^{n} = m$
- (B) Attempt any two of the following :
  - (a) Give the comparison between Inclusive OR Gate and Exclusive OR Gate. 3

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- (b) Explain the working of 1:4 Demultiplexer with the help of logic diagram and truth table.
- (c) Explain the concept of Clock and Edge Triggering.
- (A) Attempt any two of the following
  - (a) Perform the following conversions : Complete solution for your exam needs
    - (i)  $(11011)_2 = (?)_{10}$
    - (ii)  $(101)_{10} = (?)_{16}$
    - (iii)  $(BC \cdot F)_{16} = (?)_2$
  - (b) With the help of logical statement, equation, symbol and truth table explain basic gates.
  - (c) Explain the working of T Flip-flop with the help of logic diagram and state its application.

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- (B) Attempt any one of the following :
  - (a) Draw logic diagram of BCD to Decimal decoder using gates and give its truth table.
  - (b) Enlist any four input devices used in Computer and explain any one.
- (A) Attempt any two of the following :
  - (a) With the help of logical statement, logical equation, symbol and truth table explain NAND Gate.
  - (b) Define following Characteristics of the Digital Integrated Circuits :
    - (i) Figure of Merit
    - (ii) Fan In and Fan Out
    - (iii) Propogation Delay Time
  - (c) Explain the working of R-S Flip-flop by using NOR Gates with the help of its logical diagram and truth table.
  - (B) Attempt any one of the following :
    - (a) Explain the method to convert decimal numbers in to hexadecimal number and convert  $(125.8)_{10}$  in to hexadecimal number.
    - (b) Explain the working of 4-bit weighted resistor Digital to Analog Converter (DAC) with the help of circuit diagram and state its limitation.
- (A) Attempt any two of the following :
  - (a) Simplify using Boolean Laws and Draw Logic Diagram using basic gates for simplified logic equation.

## $Y = ABC + \overline{A}BC + B\overline{C}D$

- (b) Expalin the working of Tri-State Logic (TSL) Inverter with the help of circuit diagram and truth table.
- (c) Define : Register. State its applications. (Any Four)
- (B) Attempt any one of the following :
  - (a) Implement the following logic equations using Demultiplexer IC and proper gates at the output :

 $Y1 = \overline{ABC} + ABC + \overline{ABC}$ 

 $Y2 = \overline{A}B\overline{C} + A\overline{B}C + \overline{A}\overline{B}\overline{C}$ 

(b) Enlist any four output devices used in Computer and explain only one in brief.

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- 5. (A) Attempt any two of the following :
  - (a) Explain the working of C-MOS NAND Gate with the help of circuit diagram.
  - (b) Describe the functions of following pins for Decoder IC :
    - (i) Lamp Test
    - (ii) Ripple Blanking Input
    - (iii) Blanking Input
  - (c) Explain the working of left shift register by using D Flip-flop with the help of Block Diagram and Timing Diagram.
  - (B) Attempt any one of the following :
    - (a) Explain the working of Simultaneous Analog to digital converter with the help of logic diagram. State its disadvantages.
    - (b) Explain BCD Code. (Binary Coded Decimal) and state its advantages and disadvantages.

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- 5. (A) Attempt any two of the following :
  - (a) Explain the method to convert Hexa-decimal number into decimal number with two examples.
  - (b) Construct and explain EX-OR Gate by using basic gates.
  - (c) Find the output voltage of a 4-bit R-2R ladder corresponding to the binary inputs :
    - (i) 1001 Complete solution for your exam needs (ii) 0110

Given : Logic 'O" = OV and Logic '1' = +12V

- (B) Attempt any one of the following :
  - (a) Write the rules to design combinational logic circuit using Multiplexer and Demultiplexer. Also state its limitations.
  - (b) Explain the working of 3-bit Updowm Counter with the help of block diagram.

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