# 090024

# ELECTRONICS ENGINEERING

## Time : 3 hours

Full Marks : 200

### **Instructions** :

- (1) Answer ten questions choosing at least five from each Section.
- (2) The figures in the margin indicate full marks for the questions.
- (3) Assume suitable data, if necessary and indicate the same clearly.

#### SECTION-A

1.	(a)	What are insulators, conductors and semiconductors?	5	
	(b)	What is an intrinsic semiconductor? How is an <i>N</i> -type semiconductor created?	7	
	(c)	What are majority and minority charge carriers?	4	
	(d)	Write about drift and diffusion process of charge carriers in semiconductors.	4	A DOWN OF A DOWN OF A DOWN
2.	(a)	What is an ideal voltage and a current source? Explain.	4	No. of Concession, Name
	(b)	Describe the formation process of a $P$ - $N$ junction in a semiconductor diode.	10	
	(c)	Draw the V-I characteristics of a semiconductor diode.	6	
3.	(a)	State Kirchhoff's voltage and current law.	4	
	(b)	State superposition theorem and maximum power transfer theorem.	4	
	(c)	An alternating voltage $(80 + j60)$ volts is applied to a circuit and current flowing is $(-4 + j10)$ . Find the impedance of the circuit, the power consumed and the phase angle.	12	
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- 4. (a) State Thevenin's and Norton's theorems.
  - (b) Find the Thevenin equivalent circuit between A and B of the given circuit.



(c) Find the equivalent resistance of the given network between points A and B.



Describe the construction and working principle of a permanent **5.** (a) 7 magnet moving-coil instrument. Calculate the value of shunt resistance and multiplying factor for (b)converting a 5 mA meter with 20 ohm internal resistance into a 5 A 5 ammeter. What are primary and secondary transducers? Give example. 4 (c) 4 (d)What are active and passive transducers? Give example. What are the capacity of memory having 32-address lines and 8-data **6**. (a) lines? 4 What are erasable and non-erasable memories? Explain. 4 (b)What are volatile and non-volatile memories? Explain. 4 (c)What are the programmable logic devices? Describe the various types (d)5 of programmable logic devices. Convert the hexadecimal number ABC to decimal. Show the different (e)3 steps.

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- 7. (a) What is meant by radiation pattern of an antenna? Explain. 4 (b) What are the different types of aperture in antenna theory? Write in brief. 8 (c) What is meant by characteristic impedance of a transmission line? 4 Explain. (d)What is meant by polarization of a radio wave? What are the different types? 4 SECTION-B 8 **8.** (a) What are class A, class B, class C and class AB amplifiers? Explain. (b) What are the multivibrators and oscillators? What are the differences between them? 4 Write the expressions for frequency and duty cycle of a 555 timer IC (c)based astable multivibrator. Draw the circuit diagram. 8 9. (a) Write the Boolean algebra expressions of De Morgan theorem. 3 (b) Express the Boolean function  $F = A + \overline{B}C$  in a sum of minterms. The 7 function has the three variables A, B, C.
  - (c) Design a logic circuit to implement the operation specified in the following truth table. Draw the circuit.
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	Inputs				
Α	В	С	Jouipui		
0	0	0	0		
0	0	1	0		
0	1	0	0		
0	1	1	1		
1	0	0	0		
1	0	1	1		
1	1	0	1 .		
1	1	1	0		

- **10.** (a) Draw the internal block diagram of Intel 8255 programmable peripheral interface IC.
  - (b) Write a note on the features of Intel 8255 programmable peripheral interface IC.
  - (c) What are the different operating modes of Intel 8255 programmable peripheral interface IC? Explain.

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11.	(a)	Write about different addressing modes of 8085 microprocessor.	8
	(b)	What is an instruction cycle in a microprocessor?	4
	(ċ)	What is an interrupt? Explain.	4
	(d)	What are the various interrupt lines of Intel 8085 microprocessor? Write in brief.	4
12.	(a)	Justify the statement, "If a receiver knows the message being transmitted, the amount of information carried will be zero."	6
	(b)	What is channel capacity?	5
	(c)	What are the main functions of a radio receiver?	5
	(d)	What are the advantages of a superheterodyne receiver?	4
13.	(a)	Describe the major physical components of a closed-loop control system. Draw a block diagram representing the components.	8
	(b)	Describe how a closed-loop control system is more immune to parameter variation than an open-loop control system.	6
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