

I Semester B.C.A. Degree Examination, November/December 2010  
(Y2K8 Scheme)  
BCA 104 : DIGITAL ELECTRONICS

Time : 3 Hours

Max. Marks : 60

**Instruction :** Answer *all* the Sections.

SECTION – A

I. Answer **any ten** questions. **Each** question carries **1** mark. (1×10=10)

- 1) What is a semiconductor ? Give example.
- 2) What is the total resistance  $R$ , when two resistors  $R_1$  and  $R_2$  are connected in parallel ?
- 3) State Kirchoff's current law.
- 4) What is an active element in an electrical network ? Give example.
- 5) Explain sinusoidal alternating voltage with a neat wave form.
- 6) What is form factor ?
- 7) Add  $(DEF)_{16}$  and  $(876)_{16}$ .
- 8) Expand EBCDIC.
- 9) Prove that  $x + \bar{x}y = x + y$  using boolean laws.
- 10) What is a sequential logic circuit ?
- 11) Convert  $(11011)_2$  to gray code.
- 12) Convert  $-13$  in 2's complement using 8 bits.



## SECTION – B

II. Answer **any 5** questions. **Each** question carries **3** marks. (3×5=15)

- 13) State ohm's law. Calculate resistance in the circuit given voltage = 50 V and current = 5A.
- 14) Two resistors  $R_1$  and  $R_2$  are connected in series having resultant resistance of  $18\Omega$  and when connected in parallel having resultant resistance of  $4\Omega$ . Find the value of the resistors  $R_1$  and  $R_2$ .
- 15) Derive an expression for RMS value of an alternating current.
- 16) Convert  $(0.625)_{10}$  to binary, octal and hexadecimal.
- 17) Realize AND, OR and X-OR gates using NAND gates only.
- 18) Perform  $(111)_2 - (10101)_2$  using 2's complement.
- 19) Explain with a neat logic diagram 4 : 1 multiplexer.
- 20) Explain a clocked SR flipflop with preset and clear inputs.

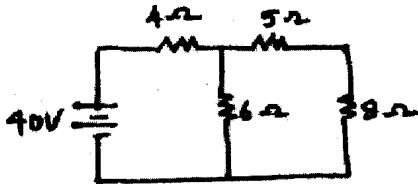
## SECTION – C

III. Answer **any 5** questions. **Each** question carries **7** marks. (7×5=35)

- 21) Simplify the Boolean function  $F(A, B, C, D) = \sum(0,2,4,5,6,7,8,10,13,15)$  using K-maps. Draw the equivalent logic circuit using basic gates. 7
- 22) Find the single-error correcting code for the message 1010 using even parity system applying Hamming code technique. 7
- 23) a) Explain Master-slave flip flop with a neat logic diagram. (4+3)  
b) What are the applications of flip flops ?
- 24) a) Explain half wave rectifier with a neat circuit diagram. (4+3)  
b) What are filter circuits ? Explain.

25) a) State and explain superposition theorem. (3+4)

b) Apply Norton's theorem to find the current in  $8\Omega$  resistor.



26) a) Explain PISO shift register with a neat block diagram. (4+3)

b) What are the applications of Registers ?

27) a) Explain with a neat block diagram the working of a 4-bit BCD Adder. (4+3)

b) State and prove De-morgan's theorem.

28) Derive equations to convert a Delta Network to a Star Network. 7

---