Seat No. : _____

# AX-102

**May-2016**

## B.Sc., Sem.-II

## CC-103 : Electronics

**Time : 3 Hours]** **[Max. Marks : 70**

**Instructions :** (1) **All** questions carry equal marks.

(2) Symbols have their own meaning.

1. (a) Discuss the characteristics of CB circuit. **7**

**OR**

Discuss the characteristics of CE circuit.

(b) Define stability. Draw a circuit of fixed bias and obtain stability factor S. **7**

**OR**

Draw a circuit diagram of collector to base bias and obtain stability factor S.

2. (a) Considering a transistor as a 4 terminal active network, define and explain the hybrid or h parameters. Also draw and explain the h parameter equivalent circuit. **10**

**OR**

(i) Draw the ac equivalent circuit of a CE amplifier and find the equations for voltage gain and power gain. **5**

(ii) In a transistor amplifier, when signal changes by 0.04 V, $I_B$ changes by 20 mA & $I_C$ changes by 2 mA. If $R_C$ = 5 kΩ & $R_L$ = 10 kΩ, find current gain, input impedance, ac load, voltage gain and power gain. **5**

(b) Give comparison of CB, CC & CE amplifier. **4**

**OR**

Define :

(1) Z parameter

(2) Y parameter **4**

3. (a) State and prove reciprocity theorem. **7**

**OR**

Give conversion between T network to π network and π network to T network. **7**

(b) Explain parallel resonance circuit and derive the expression of resonance frequency. **7**

**OR**

What is bandwidth ? Obtain the equation of bandwidth $\Delta f = \frac{fr}{Q}$ in the series resonance circuit. **7**

4. (a) Explain don't care condition. Reduce the logic equation $F(A, B, C, D) = \Sigma m (2, 3, 7) + d (10, 11, 12, 13, 14, 15)$ by using K-map. **7**

**OR**

You are given the following Boolean equation $Y = \bar{A}B\bar{C}D + \bar{A}\bar{B}C\bar{D} + A\bar{B}C\bar{D}$. Show the simplified NAND-NAND circuit for this. Also show the simplified NOR-NOR circuit.

(b) Write notes on (any **one**) : **7**

(i) Seven segment decoder

(ii) Multiplexer

5. Answer in short : **14**

(1) Draw the symbol for NPN transistor.

(2) In which configuration amplifier has highest voltage gain ?

(3) Obtain the relation between $\beta$ & $\alpha$.

(4) What is equivalent network ?

(5) Define impedance.

(6) Define potential source.

(7) What is an active region ?

(8) Define Q.

(9) Give the statement of maximum power transfer theorem.

(10) Define : Decoder

(11) Define Demultiplexer.

(12) What is ROM ?

(13) What is overlapping in K-map ?

(14) How does EX-OR gate differ from OR gate ?