ISC SEMESTER 2 EXAMINATION
SPECIMEN QUESTION PAPER
ELECTRICITY AND ELECTRONICS

Maximum Marks: ***40***

Time allowed: ***One and a half hour***

Candidates are allowed an additional ***10 minutes*** *for* only *reading the paper.*

They must ***NOT*** *start writing during this time.*

Answer all questions in ***Section A, Section B*** *and* ***Section C.***

The intended marks for questions or parts of questions are given in brackets. [ ]

SECTION A - 8 MARKS

Question 1

(i) The emitter of a transistor is _____ doped (lightly, heavily) **[1]**

(ii) State whether the statement given below is True or False. **[1]**
The value of α of a transistor is more than 1.

(iii) Define voltage gain of a Common – Emitter (CE) amplifier. **[1]**

(iv) With reference to Power Amplifier, what is meant by *impedance matching*. **[1]**

(v) With reference to vacuum tubes, state the importance of *cathode bypass capacitor*. **[1]**

(vi) If a triode has a mutual conductance of 1·5mA/V and plate resistance of 12KΩ, calculate its amplification factor. **[1]**

(vii) The base-emitter junction of a transistor, has _____. **[1]**

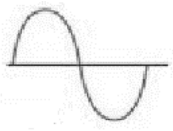
(a) a reverse bias

(b) a wide depletion layer

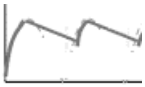
(c) low resistance

(d) low conductance

(viii) Output from a transistor amplifier is: **[1]**

(a) 

(b) 

(c) 

(d) 

SECTION B - 12 MARKS

Answer the following questions briefly.

Question 2 **[2]**

State *any two* differences between *half wave rectifier* and *full wave rectifier*.

Question 3 **[2]**

Draw a neat circuit diagram of an RC filter.

Question 4 **[2]**

With reference to transistors, obtain the relationship between **α** and **β** (symbols have their usual meaning).

Question 5 **[2]**

What inference can be drawn by maintaining control grid at:

(i) Positive potential

(ii) Negative potential

Question 6 **[2]**

State *any two* advantages of Power Amplifier over Voltage Amplifier.

Question 7 **[2]**

(i) For the Common – Emitter (CE) transistor given in ***Figure 1(a)***, β=45 and voltage drop across 1KΩ resistor which is connected to the collector circuit is 1V. Calculate the base current of the transistor.

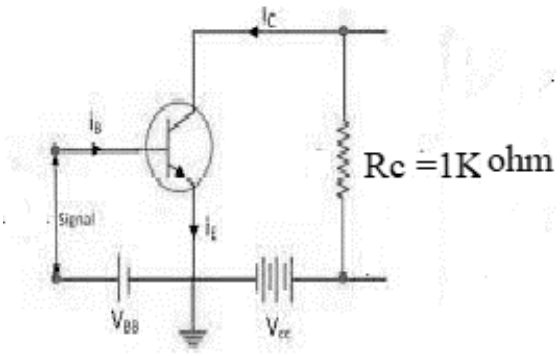


Figure 1(a)

OR

(ii) For the Common – base (CB) transistor given in ***Figure 1(b)***, the current amplification factor is 0·9. If the emitter current is 1mA, calculate the base current of the transistor.

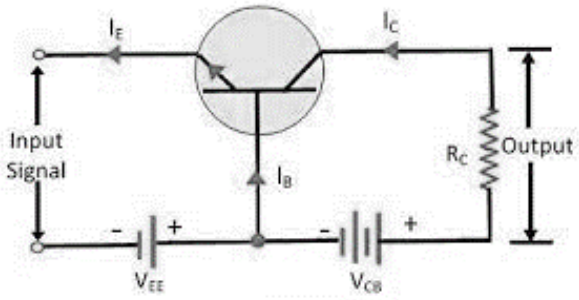


Figure 1(b)

SECTION C - 20 MARKS

Answer the following questions.

Question 8 **[4]**

With the help of a neat circuit diagram, explain the working of a bridge rectifier.

Question 9 **[4]**

With the help of a neat circuit diagram of a Common Emitter (CE) amplifier, explain how a weak signal can be amplified. **(Use either PNP or NPN type of transistor)**

Question 10 **[4]**

Figure 2 given below shows a circuit diagram of a voltage stabilizer. Explain the importance of the following:

(i) resistor 'R'

(ii) Zener diode

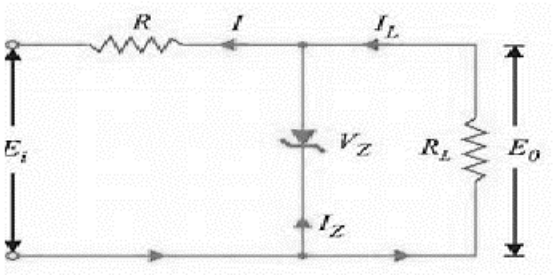


Figure 2

Question 11 **[4]**

(i) Prove $I_{rms}=\frac{I_0}{\sqrt{2}}$

OR

(ii) Prove $I_{dc}=\frac{2I_o}{\pi}$

Question 12 **[4]**

Explain the working of a crystal microphone. Also, state the energy conversion that takes place in this microphone.