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BIEL-005

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

00166

Term-End Examination

June, 2016

BIEL-005 : ANALOG ELECTRONIC CIRCUITS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Any missing data may be suitably assumed and mentioned. Use of scientific calculators is permitted.*

1. For the network shown in Figure 1, determine $4 \times 2\frac{1}{2} = 10$

(a) r_e

(b) Z_i

(c) Z_o

(d) A_v

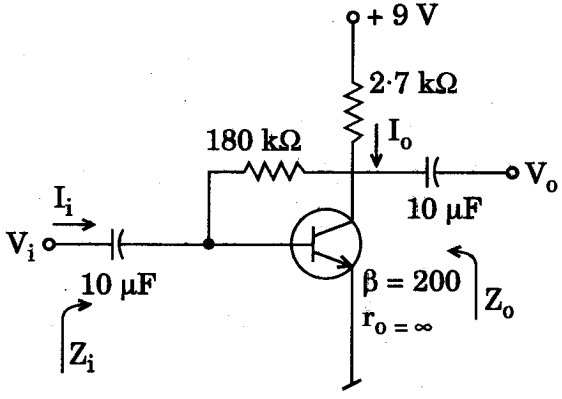

Figure 1

2. Calculate the following for the Darlington emitter-follower circuit shown in Figure 2. *4×2 $\frac{1}{2}$ =10*

(a) Input Impedance (Z_i) if r_i = 5 kΩ

(b) AC Current Gain (A_i)

(c) Output Impedance (Z_o)

(d) AC Voltage Gain (A_v)

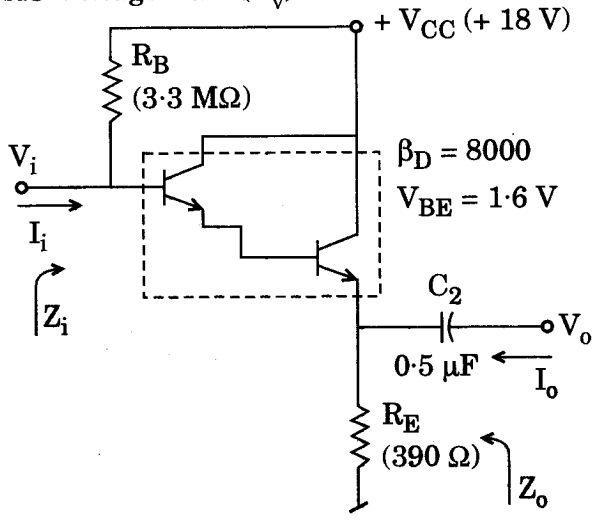

Figure 2

3. (a) Explain Multi-stage Frequency Effects. Assuming 'n' identical stages of amplifiers cascaded together, show that for the low-frequency region and the high-frequency region, the cut-off frequency of the multi-stage amplifier is given respectively by the expressions given below :

- Low-frequency region

$$f_1' = \frac{f_1}{\sqrt{2^{1/n} - 1}}$$

- High-frequency region

$$f_2' = f_2 \left(\sqrt{2^{1/n} - 1} \right)$$

(b) A two-stage amplifier has a first stage gain of 50 dB and a second stage gain of 20 dB. What is the overall gain of the amplifier in dB ? *7+3=10*

4. (a) Explain the operation of a Class-B push-pull amplifier with the help of a neatly labelled block diagram.

(b) Prove that the maximum efficiency of a Class-B amplifier is 78·5%. *5+5=10*

5. What are the advantages and disadvantages of tuned amplifiers ? With the help of a neatly labelled diagram, explain the operation of a single tuned amplifier giving its frequency response curve. *10*

6. Explain the effect of negative feedback on the following : *5×2=10*

(a) Input Impedance

(b) Output Impedance

(c) Gain

(d) Noise

(e) Frequency Response

7. Give the circuit diagram of a crystal-controlled oscillator using a crystal in series-feedback path. Derive an expression for its input impedance and the frequency of oscillation. *3+7=10*

8. Give the internal block diagram of IC-555 timer and enlist the functions performed by each pin. *10*

9. Explain the operation of an astable and a monostable multivibrator using IC-555 with the help of a neatly labelled circuit diagram. *5+5=10*

10. Write short notes on any ***two*** of the following : *2×5=10*

(a) Wein-Bridge Oscillator

(b) Double Tuned Amplifiers

(c) High-frequency Model for CE Configuration