

**GANPAT UNIVERSITY**  
**B. TECH. SEM-III (ELECTRONICS AND COMMUNICATION ENGINEERING)**  
**REGULAR EXAMINATION, NOV-DEC 2016**  
**2EC301: ELECTRONIC DEVICES AND CIRCUITS**

TIME: 3 HRS

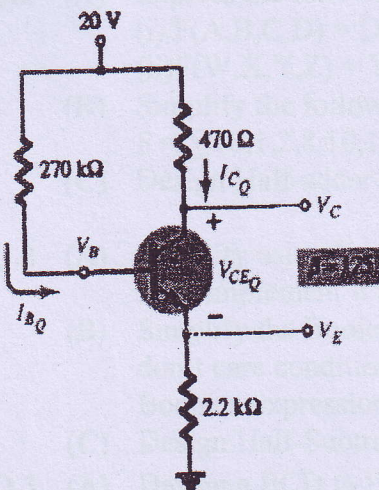
TOTAL MARKS: 60

**INSTRUCTION:-**

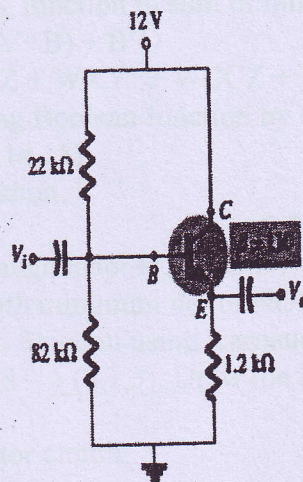
1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

**SECTION-I**

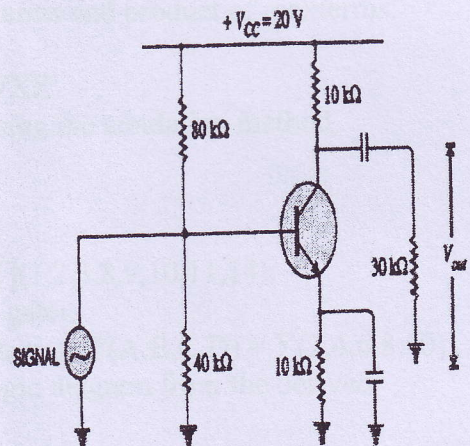
- Q.1 (A) For the common emitter configuration, draw input and output characteristics and prove that  $I_{CEO} = I_{CBO} / (1 - \alpha)$ . 6
- (B) Define following. 4  
 (i) Current gain (ii) Operating point (iii)  $h_{oe}$  (iv) Decibel
- OR**
- Q.1 (A) On which parameters, Collector current is sensitive? How? Discuss stability factors in brief. 6
- (B) How the transistor can be used as an amplifier? Explain with suitable example. 4
- Q.2 (A) Derive expressions of miller input and output capacitance. 4
- (B) Find  $I_B, I_C, V_{CE}, V_C, V_B$  and  $V_E$  for the circuit shown in Figure(a). 4
- (C) Derive relation between  $\alpha$  and  $\beta$ . 2
- OR**
- Q.2 (A) Draw the frequency response of RC coupled amplifier. Also, define cutoff frequencies and bandwidth. 4
- (B) Find  $I_B, I_C, V_{CE}, V_C, V_B$  and  $V_E$  for the Emitter follower circuit shown in Figure(b). 4
- (C) Explain transistor as a switch. 2
- Q.3 (A) Figure(c) shows the transistor amplifier in CE arrangement. The h parameters of transistor are:  $h_{ie} = 1500 \Omega$ ;  $h_{fe} = 50$ ;  $h_{re} = 4 \times 10^{-4}$ ;  $h_{oe} = 5 \times 10^{-5}$  mho. Find (i) a.c. input impedance of the amplifier (ii) voltage gain and (iii) output impedance. 4
- (B) Explain the application of Darlington pair with a suitable example. 3
- (C) Compare multistage amplifiers in terms of their frequency response, Impedance matching, Size and Cost. 3



Figure(a)



Figure(b)



Figure(c)

## SECTION-II

- Q.4 (A) Explain centre tap full wave rectifier with circuit diagram and waveforms. 4  
(B) Explain positive and negative clippers with necessary circuits and waveforms. 4  
(C) Explain transition capacitance ( $C_T$ ) and Diffusion capacitance ( $C_D$ ) in PN diode. 2
- OR
- Q.4 (A) Write a short note on N-type and P-type extrinsic semiconductor. 4  
(B) Explain biased positive and negative clamper circuit with necessary circuits and waveforms. 4  
(C) With the aid of energy band diagrams explain the insulator, conductor and semiconductor. 2
- Q.5 (A) Draw the symbol of following FETs. 3  
(i) n-channel and p-channel JFET  
(ii) n-channel and p-channel Depletion-Type MOSFET  
(iii) n-channel and p-channel Enhancement-Type MOSFET  
(B) Give the comparison of JFET and MOSFET. 2  
(C) Draw and explain output characteristic and transfer characteristic of n-channel JFET. 5
- OR
- Q.5 (A) Give the comparison of BJTs and FETs. 3  
(B) Draw construction of following FETs. 2  
(i) n-channel JFET  
(ii) n-channel Enhancement-Type MOSFET  
(C) Draw and explain the output characteristics and transfer characteristics of n-channel D-MOSFET. 5
- Q.6 (A) Explain Class A power amplifier and derive the maximum power efficiency equation. 5  
(B) Explain Schottky diode and Tunnel diode in brief. 5

END OF PAPER

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