Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 42443

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Third Semester
Electronics and Communication Engineering
EC 2205 – ELECTRONIC CIRCUITS – I
(Common to Medical Electronics Engineering)
(Regulations 2008)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What is the role of collector resistance RC ?
2. List out the advantages of voltage divider bias.
3. Compare the characteristics of CE, CB and CC amplifiers.
4. Define CMRR. How to improve it ?
5. Draw high frequency equivalent circuit diagram of BJT device.
6. Find the unity gain bandwidth of MOSFET whose g_m = 6 mA/V, C_{gs} = 8pF and C_{gd} = 4pF.
7. Define Cross-over distortion. How to overcome it ?
8. Define Heat sink.
9. Draw the circuit diagram of zener voltage regulator.
10. Define SMPS.

PART – B (5×16=80 Marks)

11. a) Determine the stability factor due to change in h_{fe} and V_{BE} of voltage divider bias circuit. **(16)**

(OR)

b) The device parameters for the circuit configuration given in Figure-1 are h_{fe} = 100 and $V_{BE(on)}$ = 0.7V. The circuit is to be biased with V_{CC} = +10V and transistor quiescent values should be I_{CQ} = 1 mA and V_{CEQ} = 5V. Calculate I_{CQ}, V_{CEQ} for h_{fe} = 50, 100, 150 and 200 and comment on the results. **(16)**

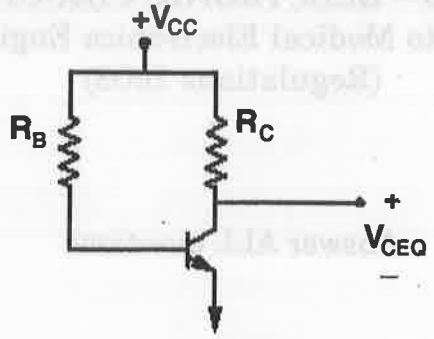

Figure-1

12. a) Determine the voltage gain and current gain of a darlington pair (BJT) amplifier. **(16)**

(OR)

b) Determine the voltage gain, input impedance and output impedance of Common-Gate (FET) amplifier. **(16)**

13. a) Determine the upper cut-off frequency of CE amplifier using miller approximation method. **(16)**

(OR)

b) For the circuit shown in Figure-2, the NFET transistor parameters are : g_m = 2mA/V, I_{DQ} = 4mA and V_A = 100V, Cgs = 1pF and Cgd = 0.4 pF. The amplifier has R_G = 100 kΩ, R_D = R_L = 15 kΩ. Calculate the mid-band gain, upper cut-off frequency. Also find the values of C_G, C_D and C_S by assuming lower cutoff frequency of 100 Hz and that the nearest break frequency be atleast a decade lower. **(16)**

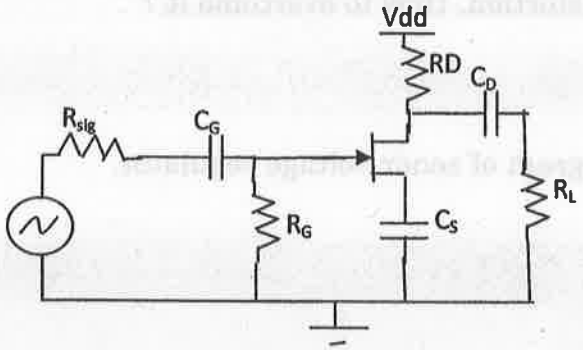

Figure-2

14. a) Determine the maximum power dissipation in a transistor (with and without heat sink). Consider the power device for which the thermal resistance parameters are :

$\theta_{dev\text{-}case} = 1.75°C/W$, $\theta_{case\text{-}sink} = 1.0°C/W$, $\theta_{sink\text{-}amb} = 5°C/W$ and $\theta_{case\text{-}amb} = 50°C/W$.

The ambient temperature is $T_{amb} = 30°C$ and the maximum junction or device temperature $T_{jma}x = T_{dev} = 150°C$. Comment on the results. **(16)**

(OR)

b) Determine the maximum conversion efficiency of Class-A power amplifier. **(16)**

15. a) Explain the Half-wave rectifier in terms of average value of output voltage and current, Ripple factor and Rectification efficiency. **(16)**

(OR)

b) Explain how the output voltage is controlled by zener voltage regulator during varying input voltage and variable load resistance. **(16)**