NEC402

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 131406

Roll No.

B.Tech.

(SEM. IV) THEORY EXAMINATION, 2014-15

ELECTRONIC CIRCUITS

Time : 3 Hours] [Total Marks : 100

Note: (1) Attempt all questions.

(2) All questions carry equal marks.

1 Attempt **any four** parts of the following:- 5×4=20

(a) Draw the circuit diagram of difference amplifier using OP-AMP and calculate the differential gain (A_d) and differential input resistance(R_{id}).

(b) For the circuit in Fig.(1) calculate the values of v_1, i_1,i_2,v_0, i_L and i_o. Also calculate the voltage gain, current gain and power gain.

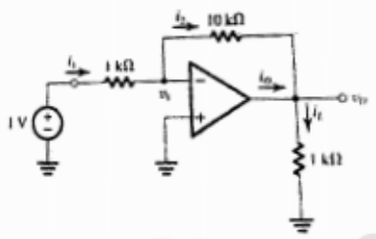

Fig.(1)

(e) An inverting amplifier with nominal gain of -20V/V employs an op-amp having a dc gain of 10^4 and a unity gain frequency of 10^6Hz. What is the 3-dB frequency f_{3dB} of the closed loop amplifier? What is the gain at 0.1 f_{3dB} and at $10f_{3dB}$.

(f) (i) Describe the terms Unity- gain Bandwidth and Full-power Bandwidth.

(ii) For an op-amp having a slew rate of 60 V/μs, what is the highest frequency at which a 20-V peak to peak sine wave can be produced at the output.

2 Attempt **any four** parts of the following:- **5×4=20)**

(a) Derive the i_d-V_{ds} relationship for NMOS working in saturation region.

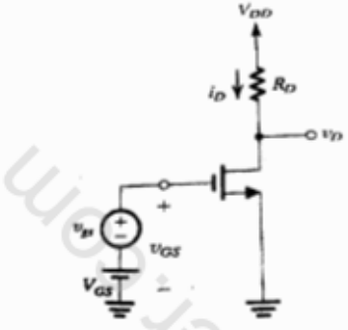

Fig.(2)

(i) Find the dc quantities I_D and V_D.

(ii) Calculate the value of gm at the bias point.

(iii) Calculate the value of voltage gain.

(iv) If the MOSFET has $\lambda = 0.001V^{-1}$, find r_o at the bias point and calculate the voltage gain.

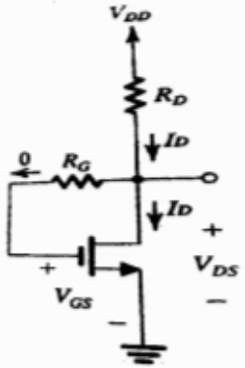

Fig. (3)

(f) Calculate the overall gain $G_v = V_o/V_{sig}$, input resistance and output resistance for a Common Source Amplifier.

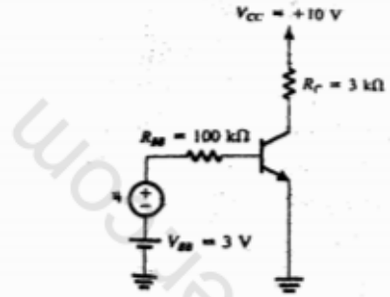

Fig.(4)

(c) Explain the effect of each capacitor of a CE amplifier with the gain frequency curve. Also discuss the low frequency response of a CE amplifier.