Con. 8958-13. Sem-III / INST / 10-12-13 GX-12155

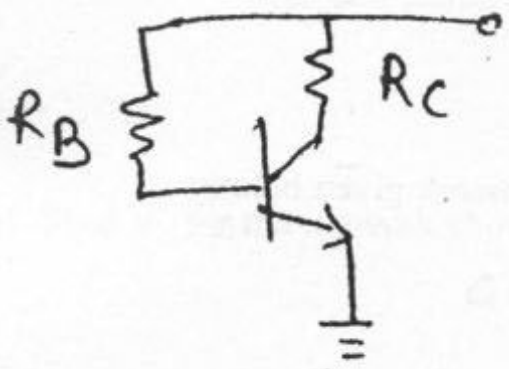
Analog Electronics (3 Hours) [Total Marks : 80

N. B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **three** questions from the remaining **five** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume **suitable** data if **necessary.**

1. Attempt any **four** questions from the following:– **20**

(a) Explain with the help of circuit diagram any one method to obtain full-wave rectification.

(b) Find R_B and R_C for the network given.



$I_{BQ} = 40\mu A$
$V_{CC} = 20V$
$I_{Csat} = 8mA$

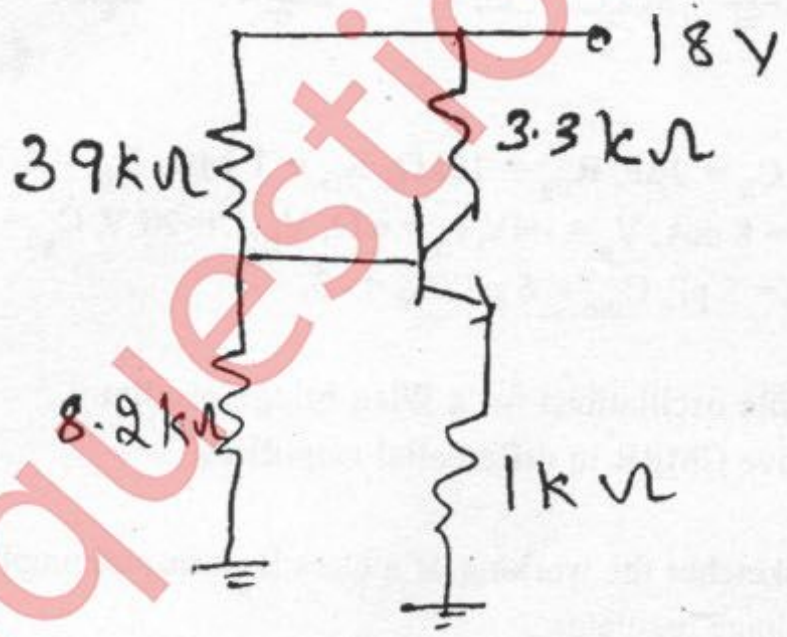
(c) Can FET be employed as a voltage controlled resistor? If yes, explain how.

(d) List five characteristics of an ideal op-amp.

(e) Draw and explain an adder circuit using op-amp.

(f) Draw and explain the typical block diagram of a regulated power supply.

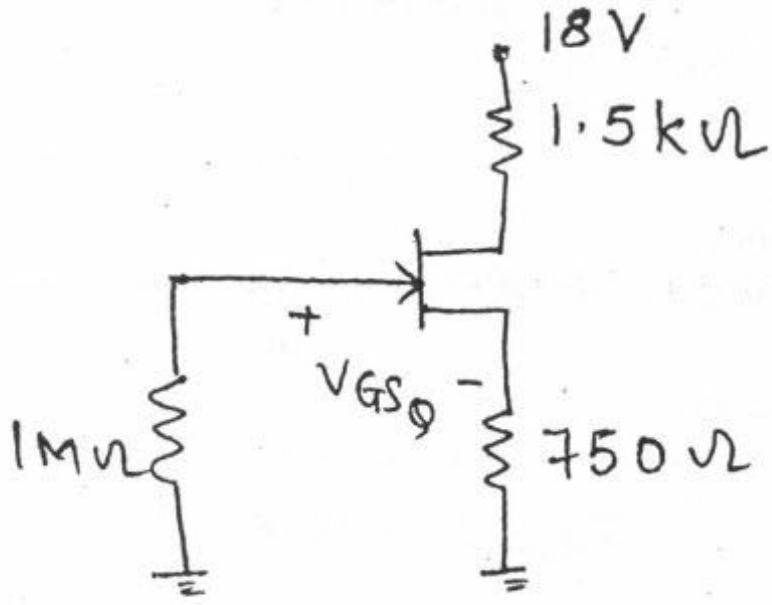
2. (a) Find I_C, I_B, V_{CE}, V_E and V_B for the following circuit. **10**



$\beta = 120$

(b) Derive the stability factor $S(I_{co})$ for emitter-stabilized Bias circuit. Calculate $S(I_{co})$ for the same circuit if R_B = 510 kΩ, R_C = 2.4 kΩ, R_E = 1.5 kΩ, V_{CC} = 2.4 kΩ, β = 100. **10**

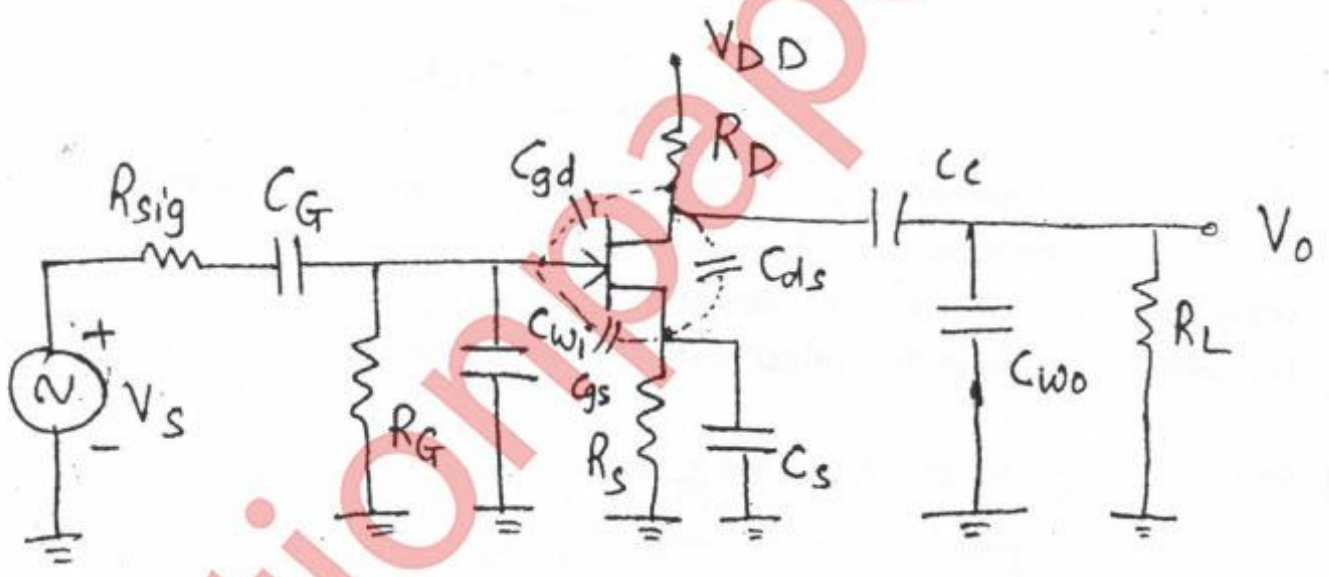
3. (a) Find I_{D_Q}, V_{GS_Q}, V_{DS}, V_D and V_G for the following network. **10**



$I_{DSS} = 10\,mA$

$V_p = -4\,V$

(b) Determine the high frequency cut-off for the network given below: **10**



$C_G = 0.01\ \mu F$, $C_C = 0.5\ \mu F$, $C_S = 2\mu F$, $R_{sig} = 10k\Omega$, $R_G = 1\ M\Omega$, $R_D = 4.7\ k\Omega$, $R_S = 1k\Omega$, $R_L = 2.2\ k\Omega$, $I_{DSS} = 8\ mA$, $V_p = -4V$, $r_d = \infty\Omega$, $V_{DD} = 20\ V$, $C_{gd} = 2pF$, $C_{gs} = 4\ pF$, $C_{ds} = 0.5\ pF$, $C_{wi} = 5\ pF$, $C_{wo} = 6\ pF$, $A_V = -3$.

4. (a) Derive the conditions for stable oscillations for a Wien bridge oscillator. **10**

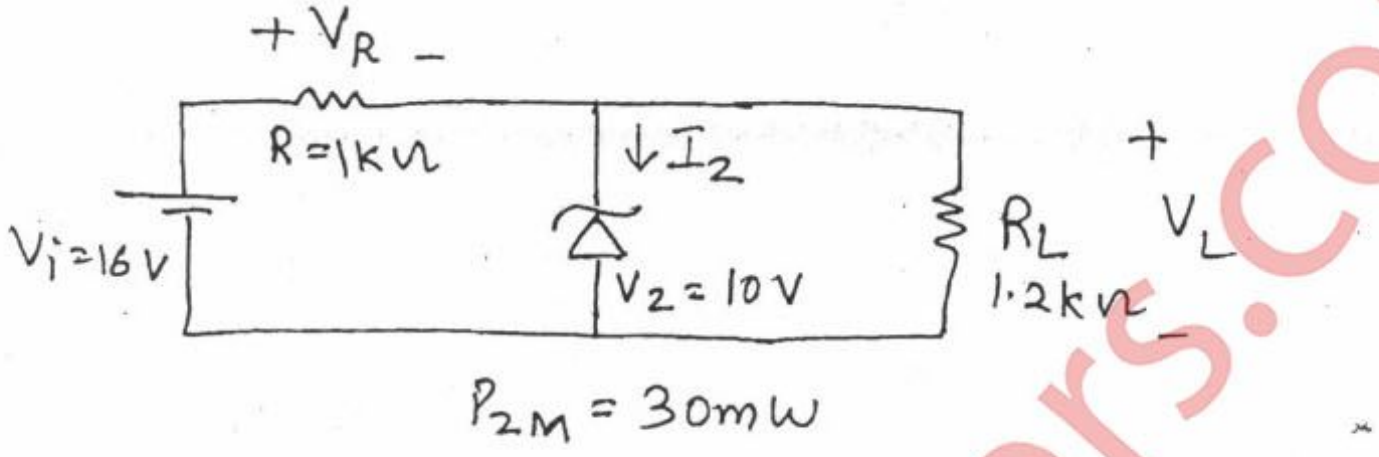
(b) Explain the methods to improve CMRR in differential amplifiers. **10**

5. (a) Draw and explain with neat sketches the working of a class B push-pull amplifier. **10**

(b) Draw and explain a series voltage regulator. **10**

6. (a) Draw and explain working of a schmitt trigger (inverting and non-inverting configuration) with input and output waveforms. **10**

(b) For the network shown below find V_L, V_R, I_2 and P_2. **5**



(c) Find V_0 for the network shown below:– **5**