Q. P. Code : 38831

1T01013 - S.E.(ELECTRONICS & TELE-COMMN)(Sem III) (CBSGS) / 49601 - ANALOG ELECTRONICS - I

(3 Hours) **(Total Marks : 80**

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

Q.1 Attempt **any 5** questions **[20]**

a) Draw switching characteristics of a diode and explain the reverse recovery time.

b) Calculate V_{CEQ} for the common base circuit shown in Fig. 1b if the transistor parameter is β=120

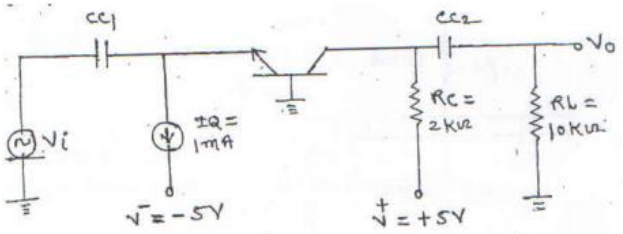

Fig. 1b

c) Draw small signal model of JFET and explain the significance of each parameter.

d) Compare CE, CB and CC configuration.

e) Draw small signal hybrid pi model of BJT including early effect.

f) What are the Barkhausean's criteria for sustained oscillation?

Q.2 a) Draw the output of the clipper circuit shown in Fig. 2a, If a sine wave of 15sinωt is applied as an input. Assume practical diode with suitable cut in voltage. **[10]**

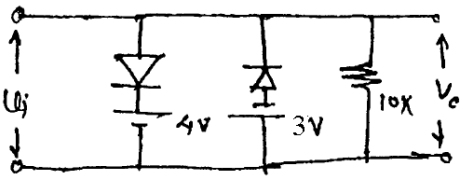

Fig. 2a

b) Derive the expression for frequency of oscillation for a Wein Bridge oscillator **[10]**

Q.3 a) Find I_{DQ} , V_{GSQ}, V_D and V_S for the circuit shown in Fig 3a **[10]**

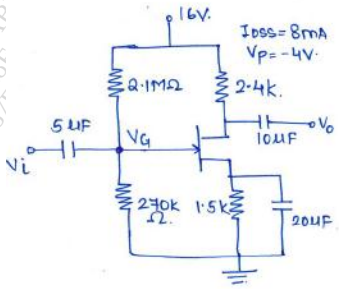

Fig. 3a

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b) Explain the construction and characteristics of n channel Enhancement MOSFET. Draw transfer and drain characteristics. **[10]**

Q.4 a) Derive expressions for voltage gain, input resistance and output resistance for source follower circuit using n channel MOSFET **[10]**

Fig.4a

b) Determine the hybrid pi parameters for the circuit shown in Fig 4b. The transistor parameters are $V_{BE\,(on)} = 0.7$ V, $\beta = 100$ and $V_A = 100$V. **[10]**

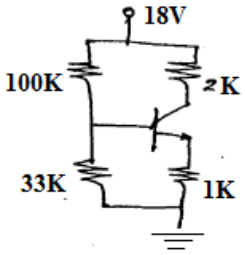

Fig. 4b

Q.5 a) For the circuit shown below in Fig.5b, the transistor parameters are $V_{BE\,(on)} = 0.7$ V, $\beta = 140$ and $V_A = \infty$. Determine Z_i, Z_o and A_V **[10]**

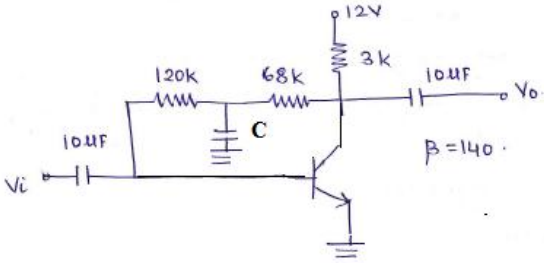

Fig. 5a

b) Draw and explain energy band diagram of MOS capacitor in accumulation, depletion and inversion region. **[10]**

Q.6 Short notes on: (Attempt **any four**) **[20]**

a) Construction and operation of schottky diode
b) LC oscillators
c) AC and DC load line
d) Small signal equivalent circuit of CC amplifier
e) Regions of operation of FET