**Registration No:** | | | | | | | | | | |

**Total Number of Pages: 02** **B.Tech**
**PCEC4201**

**3rd Semester Back Examination: 2017-18**
**ANALOG ELECTRONIC CIRCUITS**
**BRANCH: AEIE, CSE, ECE,**
**EEE, EIE, ELECTRICAL, ETC, IEE, IT**
**Time: 3 Hours**
**Max Marks: 70**
**Q.CODE: B1166**

**Answer Question No.1 which is compulsory and any five from the rest.**
**The figures in the right hand margin indicate marks.**

**Q1** **Answer the following questions:** **(2 x 10)**

**a)** With mathematical equation and suitable sketches show that operating point varies with RC (load).

**b)** State the difference between FET and BJT.

**c)** Derive the relationship between $\alpha \ and \ \beta$ in BJT.

**d)** What is Barkhausen Criterion to sustain oscillation?

**e)** An amplifier with voltage gain of 60dB uses 1/20 of its output in negative feedback. Calculate the gain with feedback in dB?

**f)** Draw Darling pair and write its application.

**g)** What is the need of current mirror? Draw one circuit.

**h)** What are the minimum values of gain in inverting and non-inverting amplifiers?

**i)** What do you mean by CMRR of an OPAMP?

**j)** What is virtual ground? What is its effect on an op-amp operation?

**Q2** **a)** In a BJT fixed bias circuit β=150,$V_{CC}$=10V,$R_C$=1KΩ,$R_B$=100 KΩ, $C_{in}$=$C_{out}$=10μf, $C_E$=100μf. Determine the Q-point of the circuit. **(5)**

**b)** Derive an expression for total collector current in CE configuration. **(5)**

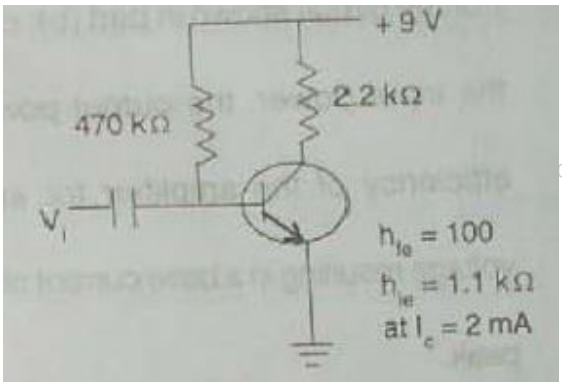
**Q3** **a)** Show that the transconductance gm of a JFET is related to the drain current IDS given by $g_m = \frac{2}{|V_P|}\sqrt{I_{Dss} I_{Ds}}$ , where the symbols have their usual meanings. **(5)**

**b)** What is stability factor? Write the general Expression for $S_{ICO} \ and \ S_\beta$. **(5)**

**Q4** **a)** Design a voltage divider circuit using a supply 24V, β=110 and an operating point of $I_{CQ}$=4mA and $V_{CEQ}$=8V. Choose $V_E$=1/8 $V_{CC}$. **(5)**

**b)** Draw and analyze a D-MOSFET configuration. Why is it called so? **(5)**

**Q5** **(a)** For a class B amplifier providing a 22-V peak signal to an 8- ohms load and a power supply of $V_{cc}$ = 25 V, determine **(6)**
Input power $P_i$(dc)
Output Power Po(ac)
Circuit Efficiency.

**(b)** 


**(4)**

For the above circuit, determine $Z_i$, $Z_o$ , $A_v$ , $A_i$ using h-parameters model. Derive the formulae used.

**Q6** **a)** Derive the expression for calculation of overall band width of multistage amplifier due to frequency effect. For non interacting stages. **(5)**

**b)** Explain frequency response of BJT amplifiers. **(5)**

**Q7** Derive the conditions for the oscillations in a RC phase shift oscillator. What type of waveform does it generate? **(10)**

**Q8** **Write short answer on any TWO :** **(5 x 2)**

**a)** Integrator and differentiator

**b)** Cascade and cascode amplifier

**c)** Class-B amplifier

**d)** Crystal Oscillator