DH-102

December-2018

B.Sc., Sem.-III

CC-201 : Electronics

Time : 2:30 Hours]   [Max. Marks : 70

Instructions : (1) **All** questions carry equal marks.

            (2) Symbols have their usual meanings.

            (3) Numbers on right side of questions indicate marks.

1. (A) (i) What is 'tilt' or 'sag' ? Draw the simplified low frequency model of CE amplifier for 'tilt' calculation. Discuss the low frequency response to a square wave and derive the formula for 'tilt'.   **7**

       (ii) Draw CE amplifier circuit and discuss the effect of coupling capacitor on low frequency response.   **7**

<div align="center">OR</div>

       (i) Draw an approximate high frequency model for determination of the short circuit current gain. Derive the equation for CE short circuit current gain.   **7**

       (ii) Discuss the high frequency response of a transformer coupled amplifier.   **7**

   (B) Attempt any **four** :   **4**

       (1) Write Miller's theorem.

       (2) Write an equation for β cutoff frequency.

       (3) What is base spreading resistance ?

       (4) Write the reason for reduction of low frequency voltage gain of an amplifier.

       (5) What is transition capacitance ?

       (6) Write the formula for transistor transconductance g_m.

2. (A) (i) Obtain an equation for voltage gain with feedback (A_{vf}) in terms of voltage gain without feedback (A_v) and feedback factor (K). **7**

(ii) Write types of negative feedback. Discuss the current series feedback in detail with suitable diagram. **7**

<div align="center">**OR**</div>

(i) What do you understand by negative feedback ? Write advantages of negative feedback and discuss any two advantages in detail with suitable diagram. **7**

(ii) (a) An amplifier's total harmonic distortion is reduced from 8% to 2% when 5% negative feedback is used. **7**

(1) What was the initial voltage gain of the amplifier when distortion was 8% ?

(2) What was the gain with 2% distortion ?

(b) An amplifier with 2.2 kΩ input resistance and 40 kΩ output resistance has a voltage gain of 80. The amplifier is now modified to provide 10% negative voltage feedback in series with the input. Calculate :

(1) The voltage gain with feedback

(2) The input resistance and output resistance with feedback.

(B) Attempt any **four** : **4**

(1) Write disadvantage of negative feedback.

(2) What type of negative feedback produce an increase in input resistance and decrease in output resistance ?

(3) A feedback amplifier essentially consists of an amplifier and _____ circuit.

(4) Why negative feedback is called degerative ?

(5) Larger the feedback factor, higher or lower the gain stability of an amplifier.

(6) With negative feedback upper 3dB frequency of an amplifier is increased or decreased.

3. (A) (i) Draw the FET family tree. Write advantages and disadvantages of the FET. 7

(ii) Discuss the theory of operation of JFET for the following cases : 7

(1) When $V_{gs} = 0$ & $V_{DS} = 0$ volt

(2) When $V_{gs} = 0$ volt and V_{DS} is increased from zero

(3) When $V_{DS} = 0$ volt and V_{gs} is increased from zero

OR

(i) Draw the symbol for N channel DE MOSFET. Explain construction and working of DE MOSFET (Depletion MOSFET). 7

(ii) Write short notes on FET as switch and FET applications. 7

(B) Attempt any **three** : 3

(1) What is FET ?

(2) Draw the symbol of N channel JFET.

(3) Why the name given MOSFET ?

(4) Write the parameters of JFET.

(5) Draw JFET drain characteristics with $V_{gs} = 0$ volt. Show Ohmic region and pinch off region.

4. (A) (i) Draw the circuit of shunt capacitor filler and explain circuit analysis for half wave rectifier. 7

(ii) Draw the circuit of LC filler and CLC (pi filler) filler. Write comparison between them. 7

OR

(i) Draw the circuit of Transistor series voltage regulator. Explain how this circuit provide load and line regulation. 7

(ii) Draw the circuit of zener diode shunt regulator. Why this circuit is called shunt regulator ? Explain working of zener diode shunt regulator. 7

(B) Attempt any **three** :

    (1)   Write the function of filler circuit.

    (2)   What is function of current regulator ?

    (3)   What is function of voltage regulator ?

    (4)   Write the advantage of Bleeder register.

    (5)   Draw the circuit of transistor shunt voltage regulator.

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