

MH-101

March-2019

B.Sc., Sem.-III

201 : Electronics

[Max. Marks : 70]

Time : 2:30 Hours]

- Instructions :**
- (1) All questions carry equal marks.
 - (2) Figures on the right indicate marks.
 - (3) Symbols have their usual meanings.

1. (A) (i) Discuss the effect of emitter bypass capacitor on low frequency response. Derive necessary formula. 7
- (ii) Discuss low frequency response of a three stage cascading CE amplifier and obtain the expression for overall voltage gain A_V . 7
- OR**
- (i) Discuss in detail α -cut-off frequency and β -cut-off frequency. Obtain the relation between f_α and f_β .
- (ii) Discuss high frequency response of a transformer coupled amplifier. 4
- (B) Answer in short : (any four) 4
- (1) Define Diffusion Capacitance.
- (2) What is Sag ?
- (3) Why is current gain larger in transformer coupled amplifier ?
- (4) Define Noise Figure.
- (5) Define rise time t_r .
- (6) Why the total current gain of a cascaded amplifier is not the product of stage current gains ?
2. (A) (i) Give the general theory of feedback. Obtain an equation for voltage gain with feedback in terms of voltage gain without feedback and feedback factor. 7
- (ii) Discuss how negative feedback is used to decrease distortion and increase bandwidth. 7
- OR**
- (i) Draw the circuit of current series feedback and explain it. 7
- (ii) (1) An RC coupled amplifier has a mid frequency gain of 200 and lower and upper 3 dB frequencies of 100 Hz and 10 kHz. A negative feedback network with $B = 0.01$ is incorporated into the amplifier circuit. Calculate : (i) gain with feedback and (ii) new bandwidth. 4
- (2) When voltage feedback is applied to an amplifier of gain 100, the overall stage gain falls to 50. Calculate the fraction of the output voltage feedback. 3

- (B) Answer in short : (any **four**) 4
- (1) What is Feedback ?
 - (2) In which type of feedback input resistance increases ?
 - (3) Write types of negative feedback.
 - (4) What is feedback factor ?
 - (5) Write disadvantages of negative feedback.
 - (6) In which circuits positive feedback is used ?
3. (A) (i) Discuss the theory of operation of JFET. 7
- (ii) Draw the circuit of common source JFET amplifier and obtain the expression for input impedance, output impedance and voltage gain from it. 7
- OR**
- (i) Explain the working of depletion MOSFET.
- (ii) Discuss how FETs are used as switches. Also, write handling precautions for MOSFET.
- (b) Answer in short : (any **three**) 3
- (1) What do you mean by unipolar device ?
 - (2) Define pinch-off voltage.
 - (3) Write applications of FET.
 - (4) State major advantages of FET over BJT.
 - (5) Define channel ohmic region.
4. (A) (i) Draw neat and clean diagram of shunt capacitor filter (C input filter) and explain in detail. Write the formula for ripple factor. 7
- (ii) Draw the circuit diagram of transistorized series voltage regulator and explain its working. 7
- OR**
- (i) Draw the circuit of transistorized shunt voltage regulator and explain its working.
- (ii) Draw the circuit of L-section filter and explain in detail. Write the formula for ripple factor.
- (B) Answer in short : (any **three**) 3
- (1) What is Bleeder Resistor ?
 - (2) What is voltage regulation ?
 - (3) Give the equation of ripple factor in 'L' filter.
 - (4) What is π filter ?
 - (5) Why transistorized series voltage regulator is called emitter follower ?