

AQ - 2649

First Semester M. Sc. (Applied Electronics) Examination
(New)

ELECTRONICS DEVICES AND CIRCUITS

Paper - I AE 2

P. Pages : 3

Time : Three Hours]

[Max. Marks : 80

- Note :** (1) All questions carry marks as indicated.
(2) Due credit will be given to neatness and adequate dimensions.
(3) Assume suitable data wherever necessary.
(4) Illustrate your answer wherever necessary with the help of neat sketches.

1. (a) In a diode how reverse saturation current is related with temperature ?
An ideal silicon diode has a reverse saturation current of $10\mu\text{A}$ at 25°C .
Calculate its dynamic resistance at 105°C for 0.7V bias in :
 - (i) For ward direction.
 - (ii) Reverse direction. 7
- (b) What is the significance of peak inverse voltage of a diode ? What will be the peak inverse voltage by drawing circuit diagrams in case of :
 - (i) Full wave rectifier capacitive filter.
 - (ii) Bridge rectifier LC filter. 7

OR

2. (a) With the help of neat ckt. diagram and waveforms, explain the working of a positive clamping circuits. 7
- (b) With the help of circuit diagram and V-I characteristics. Explain how zener diode can be utilized as voltage regulator. 7
3. (a) What is Q point of transistor ? On which parameters does the Q point depend ? Explain the effect of variations of Q point for CE transistor with dc load line. 7

AQ - 2649

P.T.O.

- (b) Draw the h-parameter model for CE transistor configuration. Explain why CE configuration is preferred in amplifier ckt. 6

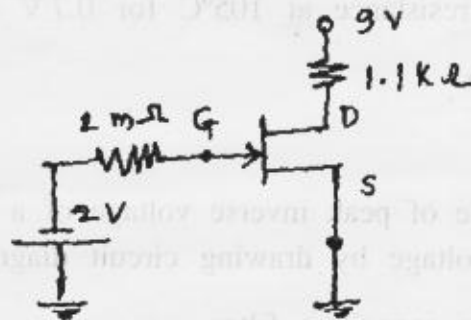
OR

4. (a) A Si transistor is biased by collector to base biased method with $V_{CC}=15\text{ V}$, $R_C=2\text{ k}\Omega$, $R_B=200\text{ k}\Omega$, $\beta=100$. Determine its operating point and stability factor. 7
- (b) For any single transistor amplifier prove that:

$$R_i = \frac{h_i}{1 - h_r A_v}$$

6

5. (a) Explain the construction, operation and $V_{DS}-I_D$ and transfer characteristics of n-channel depletion type MOSFET. 7
- (b) Explain simplified fixed bias circuit for the given ckt. calculate V_{DS} and I_D .



$$I_{DSS} = 15\text{ mA}$$

$$V_P = -5\text{ V}$$

6

OR

6. (a) Explain drain and transfer characteristics of N-channel JFET. Also explain the concept of pinch off voltage. 7
- (b) Draw CMOS transistor and explain its working. 6
7. (a) What are the effects of negative feedback? Give explanation also. 7
- (b) What are the various voltage and current feedbacks ? Explain with neat sketches. 7

OR

8. (a) Draw the ckt. of Darlington emitter follower. Explain the biasing problem associated with it. How it is overcome ? 7
- (b) What is cascode pair ? Draw the ckt. diagram and where it is used ? 7
9. (a) Explain the working principle of wien bridge oscillator circuit. Explain why negative feedback is used in addition to the positive feedback. 7
- (b) For optimally biased transformer coupled class A power Amplifier. Maximum collector current change is 100 mA. for $V_{CC}=10V$ find the power transferred to a $4\ \Omega$ speaker load if it is :
- (i) Directly coupled.
- (ii) Transformer coupled to the transistor find also the turn ratio required. 6

OR

10. (a) Explain Colpitt oscillator with circuit diagram. Specify how Barkhausen criteria is fulfilled. 7
- (b) Explain the operation of class-B push pull amplifier with neat ckt. diagram and waveforms. 6
11. (a) Draw the VI characteristics of Tunnel diode. Explain the characteristics on the basis of tunneling effect. 7
- (b) Explain the construction details and working principle of LED. List advantages of LED over conventional light source. 6

OR

12. (a) Explain the construction, working and applications of photodiode. 7
- (b) Explain how capacitance varies in a varactor diode. Sketch the characteristics. What are its application ? 6

