21103200

QP CODE: 21103200

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS, DECEMBER 2021

Second Semester

B.Sc Physics Model II Applied Electronics

Vocational Course - AE2VOT03 - BASICS OF POWER ELECTRONICS

2017 ADMISSION ONWARDS

70BF9A17

Time: 3 Hours

Max. Marks : 80

Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Differentiate between current controlled device and voltage controlled device.
2. How is JFET used as a voltage variable resistor? Explain.
3. State any two specification data's of JFET.
4. How does MOSFET differ from JFET?
5. What is depletion type MOSFET?
6. Why is a depletion type MOSFET know as an ON MOSFET?
7. Draw and explain the circuit symbol of a P channel depletion type MOSFET.
8. Explain the formation of N type inversion layer in a P type substrate of an enhancement MOSFET.
9. Draw the circuit of voltage divider biased JFET.
10. Draw the biasing circuit for an enhancement type MOSFET.
11. What is the effect of load resistance on the voltage gain as well as the output resistance of a common source amplifier?
12. Write down the expression for the voltage gain of a common gate amplifier.

(10×2=20)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Explain in detail with diagrams how voltage applied at gate of FET controls the flow of carrier through the channel.

14. A JFET has parameters of $V_{GS\ (off)}$ equal to -20 V and I_{DSS} equal to 12 mA. Plot the Transconductance curve for the device using V_{GS} values of 0,-5,-10,-15 and -20V.

15. Define transconductance and amplification factor of JFET and obtain the relation between them.

16. For an enhancement type MOSFET $I_{D(ON)}$ = 8 mA at V_{GS} = -10 V and $V_{GS(th)}$ = -2 V. Calculate the value of I_D when V_{GS} = -4 V.

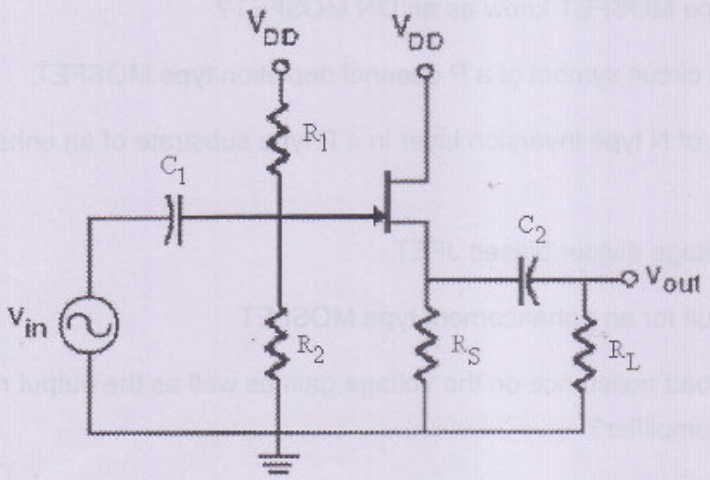
17. Draw and explain the circuit symbol of a P channel and N channel enhancement MOSFET.

18. Explain how MOSFET can be used as a resistor.

19. With neat diagram explain gate biasing for JFET.

20. What is Q point explain how to determine the Q point using D.C load line.

21. Find the voltage gain for the source follower as shown below, given R_1 = 1 MΩ, R_2 = 1 MΩ, R_S = 5 KΩ, R_L = 2 KΩ. Also find the input and output resistance. If the input voltage is 2 mV, find the value of the output voltage. Assume g_m = 5500 μS.



(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. Draw the circuit diagram and briefly discuss the drain characteristics of JFET. In the drain characteristics, mark the various regions of operation and discuss their characteristics.

23. Describe FET. Compare Junction Field Effect Transistor and a Bipolar Junction Transistor.

24. With neat sketches describe CMOS? What are the applications and advantages of CMOS? In detail explain the handling precautions for MOSFET.

25. Draw the circuit diagram of Common Source Amplifier explain its working and derive the expression for voltage gain, input resistance and output resistance.

(2×15=30)