

Reg. No. :
 Name :

**IV Semester B.Sc. Degree (CBCSS – OBE – Regular/Supplementary/
 Improvement) Examination, April 2023
 (2019 Admission Onwards)
 CORE COURSE IN PHYSICS
 4B04PHY : Electronics – I**

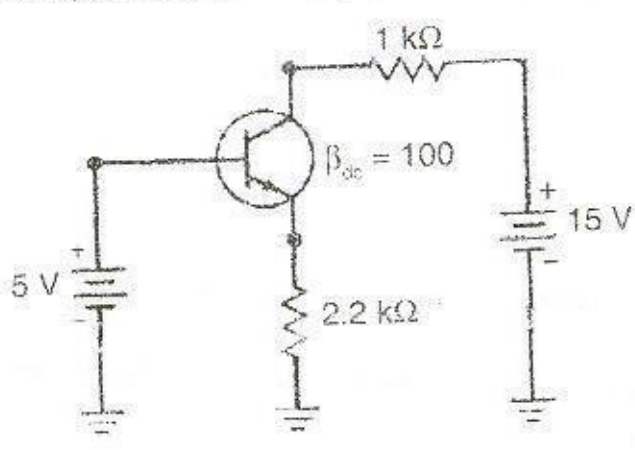
Time : 3 Hours

Max. Marks : 40

PART – A

(Short answer questions. Answer **all** questions. **Each** question carries **1** mark.)

1. What is a Zener diode used for ?
2. Using second diode approximation find the collector current in the given circuit.



3. What is a switching circuit and what is its application ?
4. What is the difference between JFET and BJT ?
5. What is the purpose of using Gray code in digital circuits ?
6. How can a NAND gate be used as a universal gate in digital logic circuits ? (6×1=6)

P.T.O.

PART – B

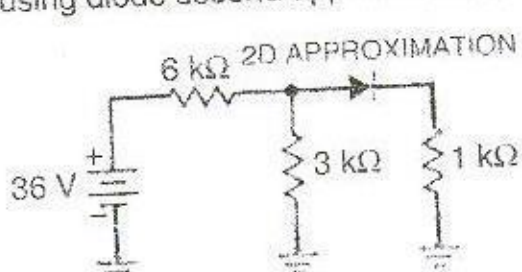
(Short essay questions. Answer **any 6** questions. **Each** question carries **2** marks.)

7. Explain the difference between the ideal diode model and the piecewise linear diode model.
8. What is the purpose of biasing in a BJT circuit ?
9. Explain the operation of a BJT amplifier in the common emitter configuration.
10. What is the difference between a JFET and a MOSFET ?
11. Explain the operation of an E-MOSFET.
12. Convert the decimal number 45 to binary, and hexadecimal numbers.
13. What is ASCII code and how is it used in computing ?
14. What is the universal property of NAND and NOR gates and how can it be used to simplify logic circuits ? (6×2=12)

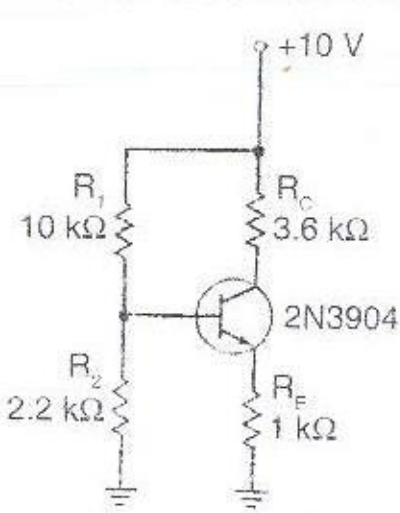
PART – C

(Problems, Answer **any 4** questions. **Each** question carries **3** marks.)

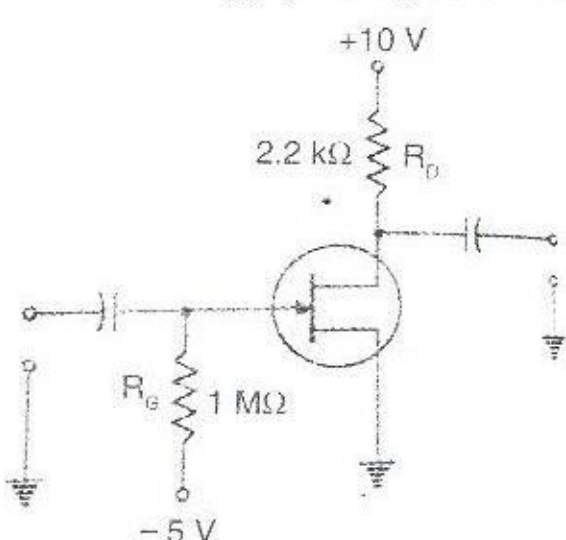
15. Calculate the load voltage, load current and diode power in the given figure using diode second approximation.



16. Calculate the collector-emitter voltage in the circuit below.



17. A JFET in the below circuit has values $V_{GS(off)} = -8V$ and $I_{DSS} = 16mA$. Determine the values of V_{GS} , I_D and V_{DS} for the circuit.



18. Perform the subtraction $1011 - 0101$ using 2's complement representation.
19. Using Boolean algebra techniques, simplify the expression $AB + A(B + C) + B(B + C)$.
20. Implement the following Boolean expression using only NOR gates : $F = A + BC$. (4×3=12)

PART – D

(Long essay questions. Answer **any 2** questions. **Each** question carries **5** marks.)

21. Explain with schematic diagram, the working principle of a half-wave rectifier and its limitations. How can these limitations be overcome ?
22. Explain the characteristics and working principle of common collector configuration in a bipolar junction transistor amplifier. What are the advantages and disadvantages of using a common collector configuration in BJT amplifiers ?
23. Explain the operation of a MOSFET and compare it to a BJT.
24. Explain the concept of binary arithmetic and how it is used in digital electronics. Discuss the significance of signed numbers and the use of 2's complement in performing subtraction. (2×5=10)