Faculty: Science and Technology (CSIT)

Level: Undergraduate   Full Marks: 100

Semester: First   Time: 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group – 'A'

Attempt all questions   (Very short answer questions)   8×3 = 24

1. State Kirchofff's first and second law.
2. What is the difference between photodiode and LED?
3. What are alpha (α) and beta (β) of a transistor? Write the relation between α and β.
4. What do you mean by JFET? How is differs from ordinary transistor?
5. What do you mean by virtual ground in operational amplifier? Explain it by drawing figure.
6. State the condition under which feedback amplifier works as oscillator?
7. Distinguish between regulated and unregulated power supply.
8. What is current booster?

Group – 'B'

Attempt any five questions.   (Short answer questions)   5×8=40

9. Distinguish between avalanche and zener effect? How the Zener diode can be used as voltage regulator?
10. How transistor can be used as an amplifier and as a switch.
11. Draw the circuit diagram of common base NPN transistor. Also discuss input, output and current transfer characteristics of common base NPN transistor.
12. Define operational amplifier? Show that how operational amplifier can be used as adder and subtractor.
13. Draw the circuit diagram of Colpitts oscillator and explain its working.
14. Write short notes on following topics:
    (a) Intrinsic semiconductor   (b) Extrinsic semiconductor
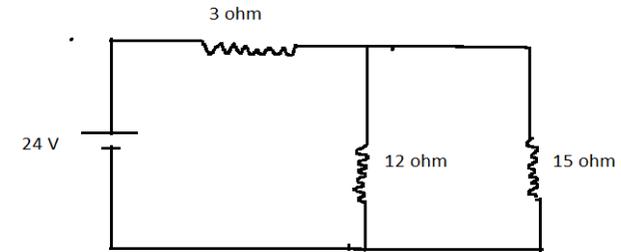   (c) Series voltage regulator   (d) Shunt voltage regulator

P.T.O.

Group – 'C'

Attempt any three questions.   (Long answer questions)   3×12 = 36

15. (a) State and explain the Norton's theorem by taking an example of arbitrary circuit diagram. **[8]**
    (b) Find the current through 15 ohm resistor using Thevenin's theorem. **[4]**

16. (a) What is rectifier? Describe the full wave rectifier. **[8]**
    (b) In the circuit given below, find load voltage, load current and diode power. (Given barrier potential of diode is 0.7 V).
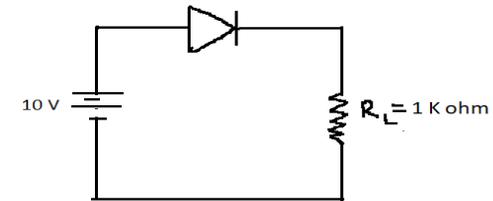
17. (a) Discuss the JFET drain characteristics when $V_{GS} = 0$. **[8]**
    (b) For a certain JFET, $I_{DSS} = 16\ mA$ and $V_{GS(off)} = -5\ V$. Determine drain current when $V_{GS} = -4\ V$ **[4]**
18. (a) Draw the circuit diagram of common emitter amplifier and discuss its working? Why there is phase inversion between input and output signal. **[8]**
    (b) For the circuit given below draw the dc load line. **[4]**

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