First PUC Annual Examination, February - 2020

Time : 3-15 Hrs. Subject - Electronics (40) Max. Marks : 70

Instructions

1. Question paper has four parts A, B, C and D
2. Part A has no choice
3. Part D has two parts part I is from Problems. Part II is of Essay type questions
4. Circuit diagram/ timing diagram Truth tables are drawn wherever necessary.
5. Problems without necessary formulae carry no mark.

PART - A

Answer ALL questions **10x1=10**

1. Mention the S.I. Unit of electric charge.
2. Define Ohm's law.
3. Write an expression for energy stored in a capacitor.
4. Define time constant of RC - circuit.
5. Name any one donor impurity.
6. Draw the symbol of tunnel diode.
7. Mention the lightly doped region of a transistor.
8. What is a phototransistor?
9. Write the decimal equivalent of $(1110)_2$
10. How many nibbles are there in a byte

PART - B

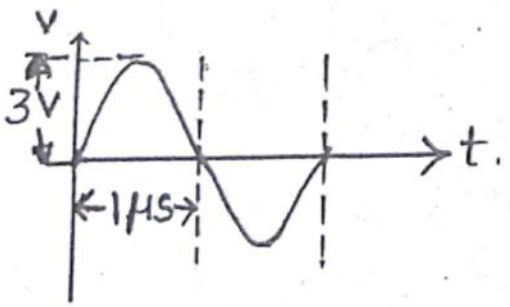
Answer any FIVE questions. **5 x 2 = 10**

11. What is glucometer? Expand ECG.
12. Mention any two applications of oscilloscope.
13. Define inductive reactance. Give the expression for inductive reactance.
14. Draw the circuit diagram of a positive diode clamper with its input - output waveforms.
15. Derive the relationship between α and β of a transistor.
16. A transistor connected in CE- mode has β=100, I_B = 50 μA Calculate I_C and α.
17. Prove $\left(A + \overline{A}B\right) = A + B$
18. Draw the symbol and truth table of NOT - gate.

PART -C

Answer any FIVE questions **5 x 3 = 15**

19. What is internet? Mention few applications of internet.
20. Derive an expression for equivalent resistance of two resistors connected in series.
21. Calculate $V_{P\text{-}P}$, V_{avg} and frequency of an AC wave form given below

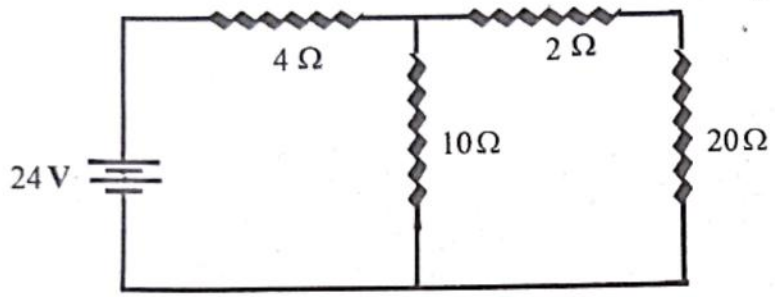


22. Explain the factors on which self inductance of a coil depends.
23. Classify solids based on energy band diagram.
24. Draw the circuit diagram of HWR and explain its working.
25. Give the comparision of Germenium (Ge) and silicon(Si) diodes.
26. Write the steps involved in PCB designing.

PART - D

I Answer any THREE questions. **3x5=15**

27. Using Thevenin's theorem, find the current through 20 Ω resistor in the following circuit.



28. Two capacitors of capacitance 20μF and 30μF are connected in series across 200V DC supply. Determine
    i) Effective Capacitance of the combination.
    ii) Charge on each capacitor.
    iii) P. d. across each capacitor.
29. In a series RLC circuit with R = 100 Ω, C = 10μF and L = 0.5H is connected to AC source of 230V, 50Hz Determine
    i) Impedence (Z) ii) current (I)
30. For a zener diode voltage regulator with V_S = 20V, R_S = 100 Ω, R_L = 680 Ω and V_z = 12V, Determine
    a) Load voltage.
    b) Voltage drop across R_S.
    c) Current through zener diode.
31. Subtract $(29)_{10}$ from $(38)_{10}$ using 2's complement method.

II Answer any FOUR questions. **4x5 = 20**

32. State and explain kirchhoff's laws.
33. Explain the construction and working of microphone.
34. Derive an expression for equivalent capacitance of two capacitors connected in parallel.
35. Discuss the growth of current in RL circuit.
36. Explain V-I characteristics of a pn-junction diode.
37. State and prove De-Morgan's theorems.