I PUC Annual Examination - February 2023

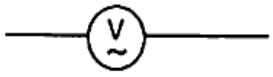
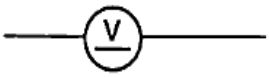
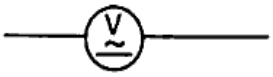
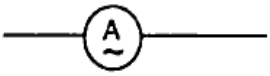
Time : 3-15 Hrs. **Subject - ELECTRONICS (40)** **Max. Marks : 70**

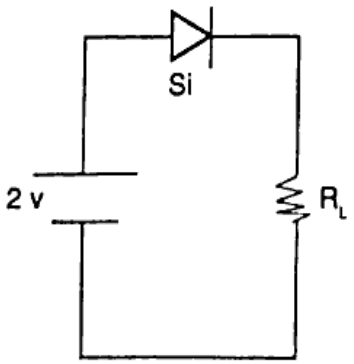
Instructions

1. **The question paper has four parts A, B, C, & D**
2. **PART-A is Compulsory**
3. **Part-D consists of essay type questions and problems together.**
4. **Circuit diagram and truth tables must be drawn where ever necessary.**
5. **Solve the problems with relevant formula.**

PART - A

I Select the correct answer from the choices given **15x1=15**

1. Who invented Integrated circuits?
   a) Shockley b) Jack kilby c) J. A. Fleming d) Lee De Forest.
2. SI unit of current is
   a) Coulomb b) a ampere c) taraday d) tesla
3. Write the relation between R.M.S. value and peak value of Ac.
   a) $V_{rms} = \frac{Vm}{\sqrt{2}}$ b) $V_{rms} = \frac{Vm}{2}$ c) $V_{rms} = \frac{2Vm}{\pi}$ d) $V_{rms} = 2Vm$
4. The symbol of AC Voltmeter is
   a)  b)  c)  d) 
5. Which type of capacitor is sensitive to polarity?
   a) Ganged capacitor b) Ceramic Capacitor c) Electrolytic capacitor d) none of these
6. What does the fourth band of a four band colour coded resistor indicate?
   a) Tolerance b) Multiplier c) Temperature co-efficient d) all the above
7. Write the expression for voltage across capacitor during charging.
   a) $V_c = E\left(-e^{-t/RC}\right)$ b) $V_c = E\left(1-e^{-t/RC}\right)$ c) $V_c = E\left(e^{-t.RC}\right)$ d) $V_c = \left(1-e^{-tRC}\right)$
8. The resistance offered by inductor to AC is
   a) Capacitive reactance b) inductive Reactance c) impedance d) Resistivity
9. The Voltage across load resistor in the follwing diagram is
   a) 0.3v b) 0 v c) 2 v d) 1.3 v



10. A Bridge Rectifier consists of
    a) One diode b) Two diodes c) Three diodes d) Four diodes

11. The Heavily doped Region of Bipolar junction transistor is
    a) Emmitter b) Base c) Collector d) All the above are equally doped.
12. The transistor has $\alpha = 0.98$, then its β is given by
    a) 49 b) 98 c) 100 d) None of these
13. What is a Nibble?
    a) group of 8 bits b) group of 4 bits c) group of 2 bits d) single bit.
14. The logic expression for output of AND gate is
    a) $Y = \overline{A.B}$ b) $Y = \overline{A} + \overline{B}$ c) $Y = \overline{A} \cdot \overline{B}$ d) $Y = A \cdot B$
15. Mention any one part number of negative fixed voltage regulator.
    a) 7905 b) 7805 c) 7705 d) 7605

II Fill in the blanks by choosing appropriate answer from those given in the bracket. **5 x 1 = 5**

[a) Iron core inductor b) chopper c) NOT gate d) LED e) Time Period]

16. DC to DC converters are called_____
17. Time taken to complete one cycle of an AC is called _____
18. Example for fixed inductor is _____
19. The diode which emits light when forward biased is _____
20. The logic gate whose output is the compliment of input is _____

PART - B

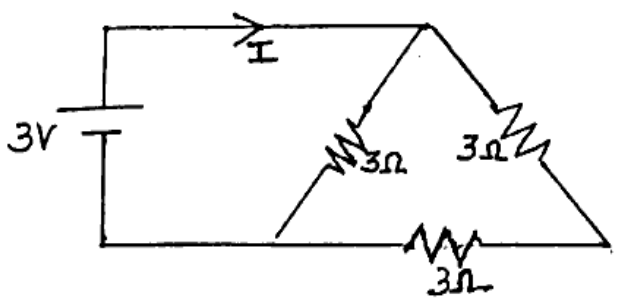
III Answer any FIVE questions. **5x2=10**

21. List any two household electronic equipments / appliances.
22. What are Primary DC sources? Give an example.
23. What are the advantages of digital thermometer?
24. Distinguish between step up and step down transformer.
25. A series LCR circuit has R = 20Ω, C = 1μF, L = 10mH, calculate the capacitive reactance for f = 50Hz.
26. Distinguish between positive and negative clamper.
27. Draw the output characteristics of transistor in CE mode and label different Regions.
28. Convert $(AD)_{16}$ to decimal number system.
29. What is an etching process?

PART - C

IV Answer any FIVE questions **5x3=15**

30. State and explain KCL.
31. Find the current in the following circuit.

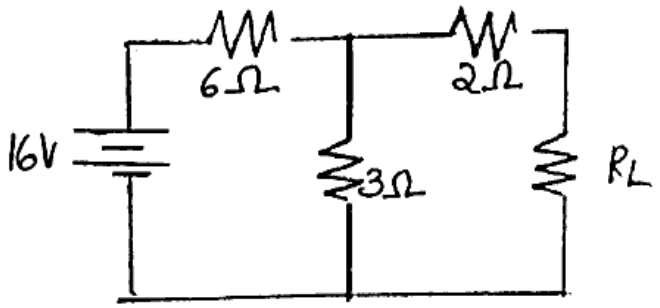


32. Calculate the energy stored in an inductor of 1.5H due to the current of 10mA through it.
33. Explain with diagram, the construction of a Potentiometer.
34. In a series LCR circuit with R = 10Ω, X_L = 50Ω, X_c = 25Ω, the applied voltage V = 50mV
    Calculate a) Z **2**
    b) I **1**
35. Explain the working of p-n junction when it is forward biased, with the help of a diagram.
36. With diagram, Explain the action of series positive clipper.
37. Explain with diagram the working of npn transistor.
38. State and prove De-Morgan's Theorems.

PART - D

V Answer any FIVE questions **5x5=25**

39. Derive an expression for effective resistance of two resistors connected in series.
40. With Necessary circuit diagram, Explain the construction and working of Loud speaker.
41. a) Explain with diagram the working of High pass filter. **3**
    b) Derive an expression for resonant frequency of series LCR Circuit. **2**
42. With circuit diagram, Explain the working of a Half wave rectifier. Draw its input and output waveforms.
43. Classify solids based on energy band diagram.
44. Explain with diagram, the working of two input NAND gate.
45. According to maximum power transfer theorem, what should be the Value of load resistance R_L, to abstract maximum power from the 16v battery as shown in the figure below? What is the value of Power?



46. Three capacitors are connected in series across 75v supply. The Voltage across each of them is 20v, 25v and 30v respectively. The charge on each capacitor is 3nc. Find the effective capacitance and also find individual capacitance.
47. For a Zener diode voltage regulator V_s = 18v, R_s = 100Ω, V_z = 8v R_L = 680Ω, Determine
    a) load voltage **1**
    b) Voltage drop across series resistance R_s. **1**
    c) Current through Zener diode. **3**
48. Subtract $(171)_{10}$ from $(183)_{10}$ using I's complement method and also veify the same using direct substraction method.