BS

I PUC ANNUAL EXAMINATION - 2018

I

Time : 3:15 Hours | ELECTRONICS - 40 | Max. Marks : 70

Note : i) Questions paper contains four parts.
ii) Part -A is compulsory
iii) Part-D contains two sub parts. (i) Problems and (ii) Essay Type questions
iv) Draw circuit diagrams wherever necessary.

Part - A

Answer ALL questions. 10x1=10

1. Expand IGBT.
2. Write the unit of electric charge.
3. What is a 'loop' in an electrical circuit?
4. Draw the circuit symbol of potentiometer.
5. Mention any one pressure transducer.
6. Name any one donor impurity.
7. Draw the symbol of a varactor diode.
8. Mention the heavily doped region of a transistor.
9. Write the I's complement of $(101101)_2$.
10. Name the type of capacitor having polarity.

Part - B

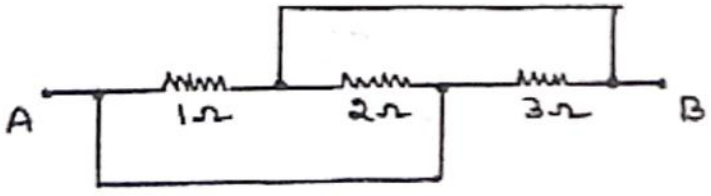
Answer any FIVE questions. 5x2=10

11. Mention any four controls of an oscilloscope.
12. Write any two advantages of ultrasound scan.
13. Distinguish between twetor and woofer.
14. What is the resistance value of SMD resistor : (a) '223' (b) '4R7'
15. Define the time constant of RC circuit and write its expression.
16. Draw the circuit diagram of low pass filter and high pass filter.
17. Write the properties of semiconductor.
18. Draw the logic diagram for the following Boolean expression.
    (a) y = AB + BC (b) y = (A+B) (B+C)

Part - C

Answer any FIVE questions. 5x3=15

19. Give a brief note on scope of electronics.
20. State and explain ohm's law.
21. Find the resistance between A and B.



22. Explain the construction of wire wound resistors.
23. Derive an expression for resonant frequency of a series resonant circuit.

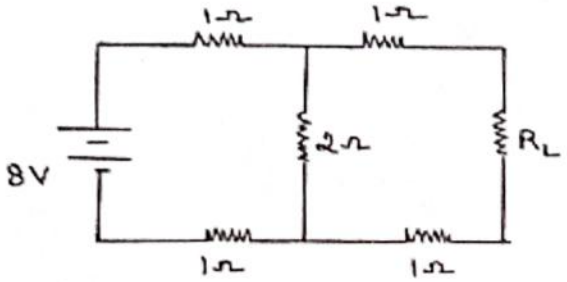
(P.T.O.)

24. For a Ziner diode voltage regulator with V_S=20V, R_S=100Ω, V_Z=12V, R_L=680Ω. Determine
a) Load voltage b) voltage drop across series resistance c) current through the series resistance
25. Define a)Bit b) Nibble c) Byte with respect to binary number system.
26. Write the steps involved in PCB designing.

Part - D

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

27. Find the value of load R_L in fig. for the maximum power to be transferred and calculate the maximum power transferred to the load.



28. a) An iron core length of $20x10^{-2}$m and area of cross section $3x10^{-4}$ m² is wound with a coil of 200 turns. Over this coil is wound another coil of 250 turns. The relative permeability of iron is 800. Determine the mutual inductance between the two coils.
b) Find the energy stored in a 5H inductor when a current of 6mA is flowing through it. 3+2

29. Determine time constant, current through an inductor during the growth at t=15 in a DC circuit containing R=1Ω and L=1H connected to a DC supply of 20V.

30. A 230V, 50Hz AC voltage is applied to the primary of 5:1 step down transformer, which is used in bridge rectifier, having a local resistance of 100Ω. Assuming the diodes to be an ideal, determine a) DC output current b) DC output voltage C) DC power delivered to the load.

31. a) Subtract $(10110)_2$ from $(101001)_2$ using 2's complement method.
b) Multiply : $(11101)_2 \times (10)_2$. 3+2

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

32. Define the following terms : a)cycle b) Time period c) Frequency d) RMS value e) Average value for on AC signal.

33. a) Derive an expression for the equivalent capacitance of two capacitors connately in parallel.
b) What do you mean by open and short circuit? 3+2

34. Classify solids based on energy band diagram.

35. Explain the working of Half wave rectifier with circuit diagram and input, output waveform.

36. Explain CE mode output characteristics of a NPN transistor and explain cut-off, saturation and active region.

37. a) What is AND gate? Draw its symbol and truth table for 2 input AND gate.
b) Simplify the given boolean expression. 3+

$$y = AB + A\overline{(B+C)}$$