SAPTHAGIRI NPS UNIVERSITY
BE 1st Semester End Examination 2024-25
Model question paper

Course Code:24BEELY104   Semester:01

Course: Basics of Electrical & Electronics Engineering   SRN:

Time:03Hrs   Max Marks:100

PART A

Answer any Ten of the following: **10x2=20**

1. What is the current produced with a 9-V battery through a resistance of 100Ω?
2. Mention two differences between active and passive elements.
3. Mention any two application of Dc motors.
4. A 6-pole generator has a lap-wound armature with 40 slots with 20 conductors per slot. The flux per pole is 25 mWb. Calculate the speed at which the machine must be driven to generate an e.m.f. of 300 V.
5. What are the types of extrinsic semiconductor?
6. Define biasing and mention the type of biasing?
7. Mention the ripple factor for half wave and full wave rectifier.
8. Which region of the transistor is highly doped?
9. Which junction is forward biased when transistor is used as an amplifier?
10. Convert $(FA876)_{16} = (?)_2$
11. How many AND, OR and EXOR gates are required for the configuration of full adder?
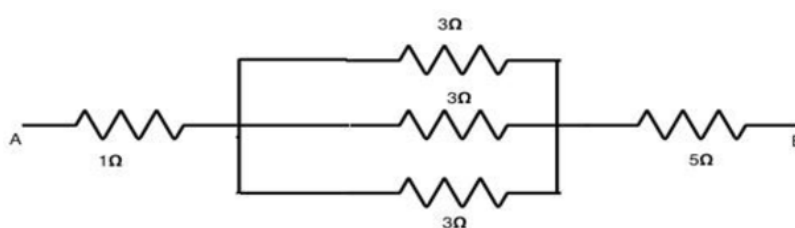12. Find the equivalent resistance between points A and B in the given figure (i).

Figure (i)

PART –B

Answer any Seven of the following: **7x5 =35**

1. Derive an expression for voltage, current and power for a pure capacitive circuit with necessary waveforms.
2. Explain Kirchhoff's current Law with example. Three resistors are connected together to form a current divider circuit as shown in figure (ii). If the circuit is fed from a 100 volts supply with a capacity of 1.5kW. Calculate the individual

branch currents using the current division rule and find the equivalent circuit resistance.
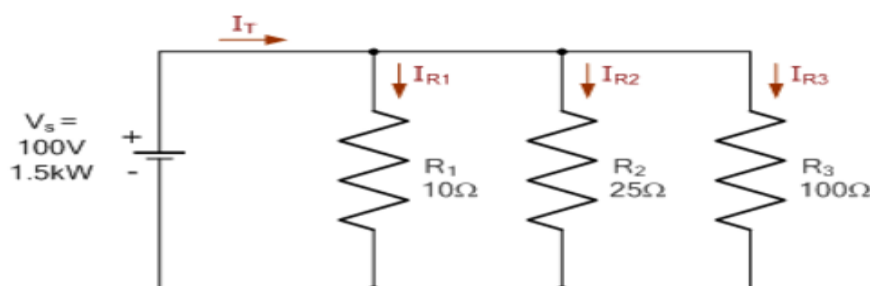

Figure (ii)

3. Derive the expression of armature torque developed in a dc motor.
4. A 100 kVA, 1100/230 V, 50 Hz single phase transformer has 60 turns on the secondary. Calculate (i) the number of primary turns, (ii) the maximum value of the core flux.
5. Mention the differences (at least five parameters) between half wave, full wave and bridge rectifiers.
6. Explain Zener diode as voltage regulator and draw the VI characteristics for the same.
7. Discuss in detail the working of an NPN bipolar junction transistor.
8. Define current gain. If the base current in a transistor is 20μA when the emitter current is 6.4mA, what are the values of α and β.
9. Simplify the following Boolean expressions and draw the logic circuits with only basic gates.
   i) Y =AB' +AB
   ii) Y=AB=AC+BD+CB

PART – C

Answer any Three of the following: **15x3 =45**

1. (a)With graphical representation state and explain ohms law.
   (b)A circuit consist of two parallel resistors having resistances of 20Ω and 30Ω respectively connected in series with a 15Ω resistor .If current through 15Ω resistor is 3A, Find (i).Current through the branches. (ii)Voltages across whole circuit. (iii)Power consumed by 20 Ω and15 Ω resistors.
   (c)Derive an expression for the RMS value of alternating quantity.

2. (a)A 230V, 50Hz a.c supply is applied to a coil of 0.06H inductance and 2.5Ω resistance connected in series with a 6.8μF capacitor. Calculate:
   (i)Impedance
   (ii) Current
   (iii)Phase angle between current and voltage.
   (iv)Power factor and
   (v)Power consumed.
   (b) With a neat sketch explain the construction and working of a dc Generator.

(c) Define power factor and its significance.

3. (a)What is breakdown voltage explain avalanche breakdown and zener breakdown.
(b)Draw the VI characteristics of a PN junction diode.
(c)Find the current through the diode in the circuit shown in figure (iii). Assume the diode to be ideal.

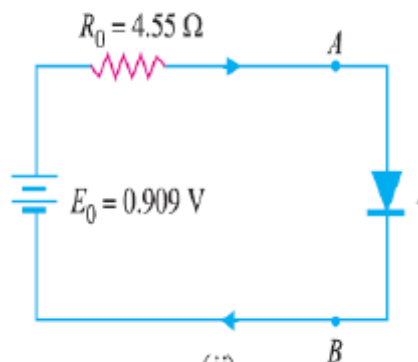$R_0 = 4.55\ \Omega$

A

$E_0 = 0.909\ V$

1

B

Figure (iii)

4. (a) Explain in detail the transistor working as a LED.
(b) Mention the advantages and disadvantages of a Feedback Amplifier.
(c) Explain how transistor can be used as switch.

5. (a)Define universal gates? Realize OR, AND and NOT gates using NAND gates only.
(b) Prove that:
(I)   A+A'B+AB'=A+B
(II)   AB+A'B+A'B'=A'+B
(III)   (X+Y)(X+Z)=X+YZ
(IV)   (X+Y)(X+Y')=X
(V)   X+XY=X

(c) Explain the working of SR flip flop with the help of truth table and logic diagram.