

**11N507**

Roll No

Total No of Pages: **3****11N507****B. Tech. I - Sem. (New Scheme) Main Exam., July – 2022****1FY2 – 07 Basic Electrical Engineering****Common to all Branches****Time: 2 Hours****Maximum Marks: 70****Min. Passing Marks:****Instructions to Candidates:**

*Part – A: Short answer questions (up to 25 words)  $5 \times 3$  marks = 15 marks. Candidates have to answer 5 questions out of 10.*

*Part – B: Analytical/Problem Solving questions  $3 \times 5$  marks = 15 marks. Candidates have to answer 3 questions out of 7.*

*Part – C: Descriptive/Analytical/Problem Solving questions  $2 \times 20$  marks = 40 marks. Candidates have to answer 2 questions out of 5.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.  
(Mentioned in form No. 205)*

1. NIL2. NIL**PART- A**

Q.1 What are Kirchhoff's laws?

Q.2 Write down different types of energy sources.

Q.3 What are the various values defined for a.c. quantity?

Q.4 Write down the relationship for line current and phase current and line voltage and phase voltage for star connection of 3- $\phi$  system.

Q.5 What are the different parts of DC machine?

Q.6 What is an ideal transformer?

Q.7 What are different types of transistors?

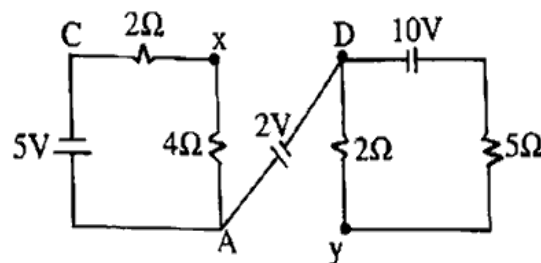
Q.8 Write down the different types of rectifiers?

Q.9 What is Silicon Controlled Rectifier (SCR)?

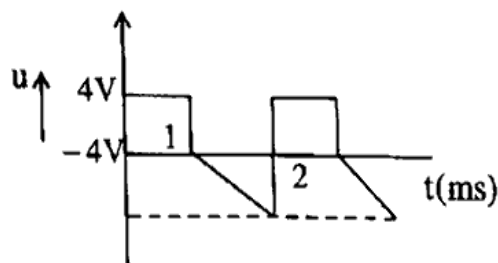
Q.10 What is modulation in communication system?

### PART-B

Q.1 Find voltage  $V_{xy}$  in the given network -



Q.2 Calculate the RMS and average value of the voltage wave shown in figure below.



Q.3 How power can be measured using single wattmeter method? Derive the relation for power factor.

Q.4 What is the construction and working principle of transformer? .

Q.5 Explain construction and working principle of DC Machines? .

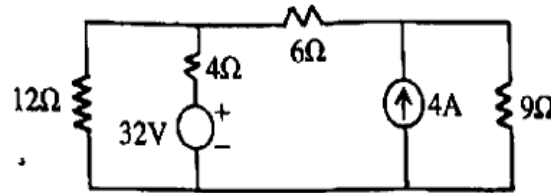
Q.6 Write short note on SCR, TRIAC and UJT.

Q.7 Discuss the amplitude modulation in detail. Derive the voltage equation of amplitude modulation.

## PART-C

Q.1 (a) State and explain Thevenin's Theorem.

(b) Compute the power dissipated in  $9\Omega$  resistor using superposition theorem.



Q.2 A 3-phase motor operating on a  $400\text{ V}$  balanced system develops  $18.65\text{ kW}$  at an efficiency of  $0.87$  per unit and a power factor of  $0.85$ . Calculate the line current and phase current if the windings are delta connected.

Q.3 (a) An 8 pole DC machine has a wave winding containing 600 conductors. Calculate the generated emf when the flux per pole is  $0.08\text{ wb}$  and speed is  $215\text{ rpm}$ . If the flux per pole is made  $0.05\text{ wb}$ . At what speed should the armature be drawn to generate  $500\text{V}$ ?

(b) A  $200\text{ kVA}$ ,  $3300/240\text{V}$ ,  $50\text{Hz}$  single phase transformer has 80 turns on the secondary winding. Assume an ideal transformer calculate:

(i) Primary and secondary current on full load

(ii) The maximum value of flux

(iii) The no. of primary turns

Q.4 Compare CB, CE and CC configuration of a transistor. For CE configuration prove that  $I_C = \beta I_B + (\beta + 1) I_{CO}$

Q.5 Describe the different types of communications in details.