| Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, BIE, B. Agri.	Pass Marks	32
Year / Part	I / I	Time	3 hrs.

Subject: - Basic Electrical Engineering *(EE401)*

✓ Candidates are required to give their answers in their own words as far as practicable.
✓ Attempt **All** questions.
✓ The figures in the margin indicate **Full Marks**.
✓ Assume suitable data if necessary.

1. a) What is the factor responsible for the deviation of the practical sources from their ideal behavior? Explain the effect of this factor on the terminal characteristics of the voltage source. [6]

   b) Write down the steps to calculate Norton's equivalent resistance in the circuit with a suitable example. [4]

   c) A conductor material has a free electron density of 10^{24} electrons per m^3. When a voltage is applied a constant drift velocity of 1.5×10^{-2} m/s is attained by the electrons. If the cross sectional area of the material is 1 cm^2, calculate the magnitude of the current. [6]

2. a) Explain with neat diagram and write the equations for Delta- Star Conversion and for Star-Delta Conversion. [4]

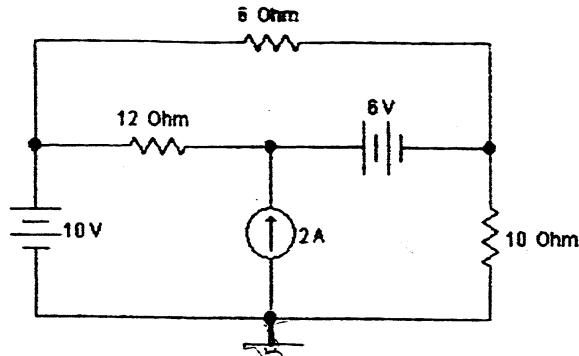   b) Find the equivalent resistance across the terminals A and B, R_{AB}. [6]
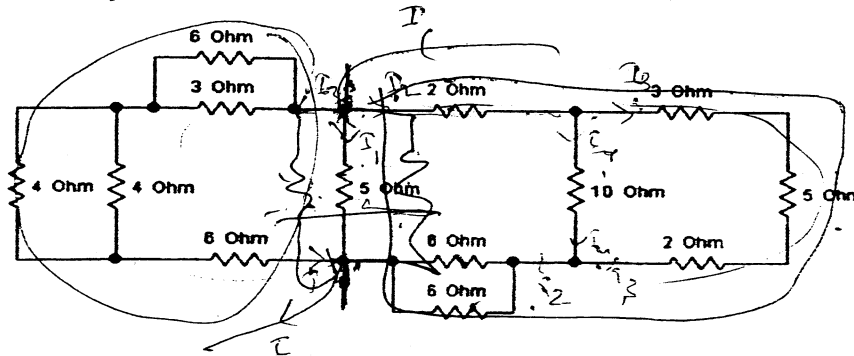
   c) "Thevenin's theorem and Norton's theorem are dual of each other". Justify the statement with suitable example. [6]

3. a) Use Superposition theorem to find the current I_L through 2 Ω resistors in figure below. [8]
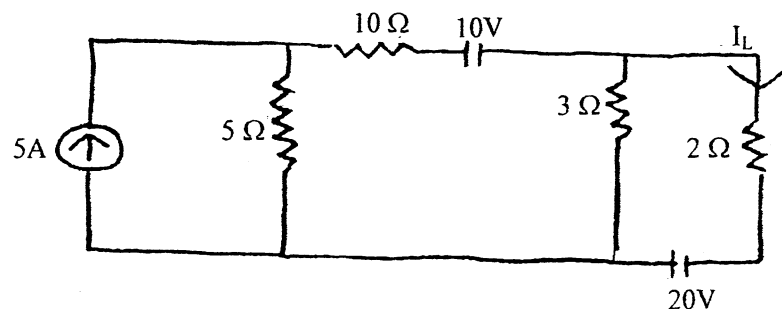
OR

Find the current passing through 10 Ω resistor using loop current method.

b) Calculate the inductance that must be connected in parallel with a 100 MH inductor to give a total inductance of 70 mH. Assume no mutual inductance between the two. [4]

c) Two impedances (3-4j) and (8+6j) are connected in parallel across an ac voltage source. If the total current drawn from the source in 25 A, find the total active power consumed by the impedances. [4]

4. a) Find the average value, rms value of the voltage waveform given below. [8]
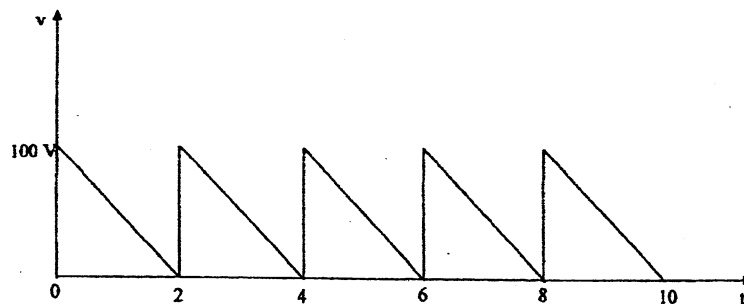
b) An Industrial load consists of the following: [8]

i) A load of 200 KVA @ 0.8 power factor lagging
ii) A load of 50 KW @ unity power factor
iii) A load of 48 KW @ 0.6 power factor leading
Calculate the total KW, Total KVAR, Total KVA and the overall power factor.

5. a) A 100 KW load at 0.8 lagging power factor is being supplied by a 220 V, 50 Hz source. Calculate the reactive power drawn from the source. If a capacitor connected parallel to the load improves its power factor to 0.9. Find the capacitance of the capacitor. Also calculate the current drawn from the source before and after connecting the capacitor. [8]

b) With the help of necessary Phasor diagram and circuit diagram, explain the two wattmeter method of Active Power Measurement in Three Phase AC system? What is the variation of wattmeter readings with load Power Factor? [8]