



BRAINWARE UNIVERSITY

Term End Examination 2018 - 19

Programme– Bachelor of Technology in Computer Science & Engineering / Bachelor of Technology in Electronics & Communication Engineering

Course Name – Basic Electrical Engineering

Course Code – BELE010201

(Semester – 1)

Time allotted: 3 Hours

Full Marks : 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question)

10 x 1 = 10

1. *Choose the correct alternative from the following*
 - (i) In a parallel R-L-C circuit, the power factor at resonance is

a. 0.5	b. unity
c. 0.75	d. zero
 - (ii) The efficiency of a transformer is maximum when

a. Copper losses are zero	b. Copper losses are equal to iron loss
c. Iron losses are zero	d. Copper losses are less than iron loss
 - (iii) Bulbs in street lighting are all connected in

a. Parallel	b. Series
c. Series - parallel	d. End to end
 - (iv) Kirchhoff's laws are valid for:

a. linear circuits only	b. passive time-invariant circuits only
c. non-linear circuits only	d. both linear and non-linear circuits.
 - (v) Full form of MCCB

a. Mini Case Circuit Breaker	b. Moulded Case Circuit Breaker
c. Mounted Case Circuit Breaker	d. None of these.
 - (vi) In a star connected system, the relation between the phase and line voltage is

a. $V_P = V_L$	b. $V_P = \sqrt{3}V_L$
c. $V_P = V_L/\sqrt{3}$	d. $V_P = V_L/3$

- (vii) In an electrical circuit, if the current lags the voltage by 60° , the circuit nature is
- RC
 - RL
 - LC
 - all of these.
- (viii) A DC-DC Buck converter is used to
- Step up the voltage
 - Step down the voltage
 - Provide isolation
 - None of these
- (ix) Iron loss of a transformer is 100 Watt at half load. At full load, the iron loss would be:
- 100 Watt
 - 50 Watt
 - 200 Watt
 - 400 Watt
- (x) An induction motor is
- Self-starting with zero torque
 - Self-starting with high torque
 - Self-starting with low torque
 - Non self-starting

Group – B

(Short Answer Type Questions)

3X5 = 15

Answer any *three* from the following

- Explain real power, reactive power and apparent power. 5
- Derive the input-output voltage relation of a Buck Converter. 5
- Explain the various losses of transformer. 5
- Explain the principle of working of a 3-phase induction motor. 5
- What is MCB? Mention few advantages of MCB over Fuse. 5

Group – C

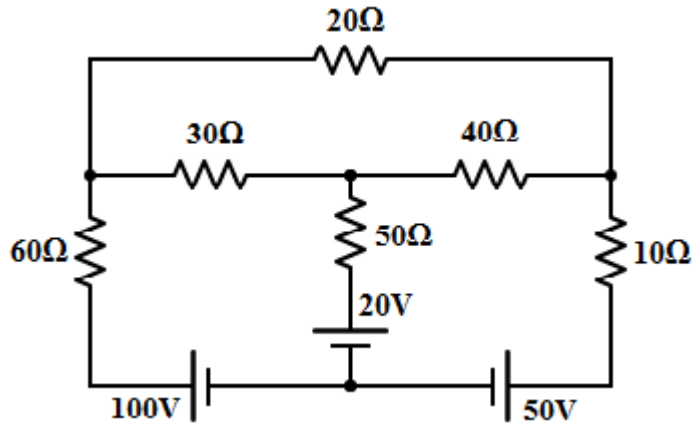
(Long Answer Type Questions)

3x 15 = 45

Answer any *three* from the following

- Explain star-delta and delta-star conversion with the help of a purely resistive circuit. 8
 - Derive the expression of resonant frequency of an R-L-C series circuit. 7
- Derive the expression for induced EMF in the secondary of a single phase transformer. 6
 - In a 50kVA, 11kV/400V transformer, the iron and copper losses are 500W and 600W respectively under rated conditions.
 - Find the number of turns in the primary when secondary has 20 turns. 4
 - Calculate the efficiency on unity power factor at full load. 5
- Establish the equivalence between Thevenin's and Norton's theorem. 7

- (b) Calculate the current through each branch of the circuit.



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10. (a) Explain important parts of a DC machine 3
 (b) Draw the torque-slip characteristic of a three phase induction motor. 2
 (c) A 3-phase 6-pole, 50 Hz induction motor has a slip of 1% at no load and 3% at full load. Calculate:
 (i) synchronous speed
 (ii) no-load speed
 (iii) full load speed
 (iv) frequency of rotor current at stand still and
 (v) frequency of rotor current at full load. 10
11. Write short notes on *any three*:
 (a) Importance of Earthing 5
 (b) Various types of electrical cables 5
 (c) DC-DC Buck Converter 5
 (d) Auto-transformer 5