

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2018 Roll No.

B.Tech.

(SEM. I) ODD SEMESTER THEORY EXAMINATION 2012-13

ELECTRICAL ENGINEERING

Time : 3 Hours

Total Marks : 100

Note : (1) Attempt **ALL** questions.

(2) All questions are of equal marks.

(3) Notations used have usual meaning.

(4) Assume any relevant data, if missing.

1. Attempt any **TWO** parts of the following :

(a) An alternating voltage is $v = 100 \sin 100t$. Find :

- (i) Amplitude
- (ii) Time period
- (iii) Angular velocity
- (iv) Form factor
- (v) Peak factor.

(b) Differentiate among real, reactive and apparent power. Give $v = 200 \sin 377t$ V and $i = 8 \sin (377t - 30)$ A for an a.c. circuit. Determine :

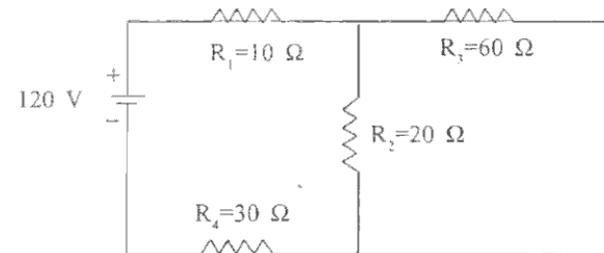
- (i) Power factor
- (ii) True power
- (iii) Apparent power
- (iv) Reactive power.

(c) Explain the concept of bandwidth and quality factor for a series R-L-C circuit. Derive their expressions.

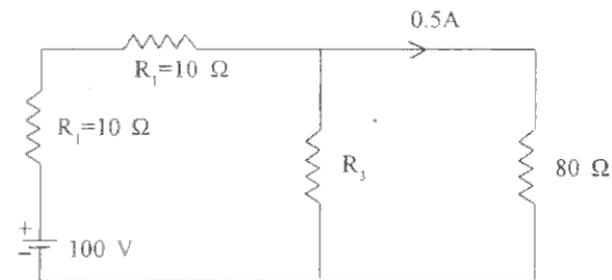
2. Attempt any **TWO** parts of the following :

(a) State and prove Maximum Power Transfer Theorem.

(b) Solve using Super-position Theorem :



(c) Use Mesh Analysis to solve the given network :



(d) Explain the construction and principle of operation of dynamometer wattmeter.

(e) Explain the construction and principle of operation of a PMMC type instrument.

3. Attempt any **TWO** parts of the following :
- (a) Explain basic principle of operation of a single phase transformer. Draw and explain no-load phasor diagram for a single phase transformer.
 - (b) Derive emf equation for a single phase transformer. It is desired to have a 4.13 m Wb maximum core flux in a transformer at 110V and 50 Hz. Determine required number of turns in primary.
 - (c) Single-phase transformer gave following test results :
Rating 100 kVA, 11 kV/220 V, 50 Hz
OC test : 220 V, 45 A, 2 kW
SC test : 500 V, 9.09 A, 3 kW.
Determine equivalent circuit parameters referred to 1v side.

4. Attempt any **TWO** parts of the following :
- (a) Derive emf equation of a d.c. generator. What will be change in induced emf if flux is reduced by 20% and speed is increased by 20% ?
 - (b) Discuss the method of speed control of d.c. shunt motor.
 - (c) Explain the principle of operation of synchronous motor. Give its merits and demerits.

5. Attempt any **TWO** parts of the following :
- (a) Draw and explain slip-torque characteristics of three phase induction motor. A three phase, 50 Hz, induction motor has a full-load speed of 1460 rpm. Calculate slip, number of poles and frequency of rotor induced emf.

- (b) Why starters are necessary for starting of three phase induction motor ? Describe Auto-transformer method of starting in detail.
- (c) Explain the principle of operation of Single Phase Induction Motor.

UPTUonline.com