## B.Tech II Year I Semester (R15) Supplementary Examinations June 2018

## BASIC ELECTRICAL \& ELECTRONICS ENGINEERING

## (Common to CSE \& IT)

Time: 3 hours
Max. Marks: 70
Answer all the questions
(Use single answer booklet only) *****
PART - A
UNIT - I
1 (a) Define average value, RMS value, peak factor and form factor of an alternating quantity.
(b) Find RMS and average value of the waveform as shown in figure below.


2 (a) State and explain superposition theorem.
(b) Apply the superposition principle to the circuit shown in figure to find current $i_{3}$.


3 (a) Explain the principle of operation of a dc generator.
(b) An 8-pole DC shunt generator has 778 wave connected armature conductors running at 600 rpm , supplies a load of $12.5 \Omega$ resistance at a terminal voltage of 250 V . The armature resistance is $0.24 \Omega$ and the field resistance is $250 \Omega$. Find the armature current, the induced emf and the flux per pole.

## OR

4 (a) Describe how a Swinburne's test is conducted on DC machines. State its advantages and disadvantages.
(b) Find the efficiency at half load for a 600 V shunt generator using the following data:

Full load output power 1200 kW , armature resistance $=0.005 \Omega$, shunt field resistance $=60 \Omega$, brush contact drop $=1 \mathrm{~V}$ per brush, mechanical and iron losses at rated load $=20 \mathrm{~kW}$, stray load loss $=$ $1.2 \%$ of output.

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UNIT - III
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5 (a) Derive the expression for voltage regulation of single phase transformer.
(b) A $10 \mathrm{KVA}, 2500 / 250 \mathrm{~V}$, single phase transformer gave the following test results:
O.C. test: $250 \mathrm{~V}, 0.8 \mathrm{~A}, 50 \mathrm{~W}$
S.C. test: $60 \mathrm{~V}, 3 \mathrm{~A}, 45 \mathrm{~W}$
(i) Calculate the efficiency of half full load at 0.8 p.f.
(ii) Compute the voltage regulation at 0.8 p.f. leading.

## OR

6 (a) Deduce the EMF equation of a 3-phase alternator.
(b) Describe working principle of 3-phase induction motor.

## Code: 15A99301

## PART - B

## UNIT - I

7 Explain in detail about the operation of $P$ \& $N$ type semiconductors along with the required diagrams. OR
8 Illustrate with diagram and discuss about operation of full-wave bridge rectifier.

## UNIT-II

9 Describe in detail about the common collector configuration of bipolar junction transistor and its I/O characteristics.

## OR

Explain about the construction and operation of JFET with the essential diagrams.

What are the conditions for sustained oscillation? Write a brief note on principle and operation of RC phase shift oscillator with necessary circuit.

OR
Discuss in detail about inverting and non-inverting amplifiers with necessary circuit diagrams.

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