Total No. of printed pages = 4

PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Answer any *five* questions.

1. (a) State and explain Ohm's law and Kirchhoff's laws.   6

   (b) Two resistors are connected in parallel and a voltage of 200V is applied to the terminals. The total current taken is 25A and power dissipated in one of the resistors is 1500W. What is the resistance of each element ?   8

[Turn over

2. (a) What do you mean by phase difference ? Explain also lagging power factor and leading power factor. 6

(b) An alternating voltage $(80+60j)$V is applied to a circuit and the current flowing is $(-4+10j)$A. Find :

(a) the impedance of the circuit

(b) the power consumed

(c) the phase angle. 8

3. (a) What is transformer ? A single phase transformer rating is 11500/2300V, 100 kVA. Calculate the rated current in primary winding and secondary winding. 6

(b) An inductance of 1H is in series with a capacitance of 1μF. Find the impedance of the circuit when the frequency is (a) 50Hz, (b) 1000Hz. 8

4. (a) Write the working principle of full-wave bridge rectifier with a suitable diagram. 6

(b) A diode with $V_F = 0.7V$ is connected as a half-wave rectifier. The load resistance is 500Ω and the (rms) AC input is 22V. Determine the peak output voltage, the peak load current and the diode peak reverse voltage. · 8

5. (a) What are the different characteristics of a transistor in CE-mode ? 6

(b) The base current in a transistor is 0.01mA and the emitter current is 1mA. Calculate the values of current amplification factor and base current amplification factor. 8

6. (a) What are the indications of a fully charged lead acid cell ? 6

(b) A battery of emf 50 volt and internal resistance 2Ω is charged on 100V direct mains. What series resistance will be required to give a charging current of 2A ? 8

7. (a) Derive the RMS value of a sinusoidal current. 6

(b) The following phasors are given :
$A = 20 + 20j$
$B = 30\angle -20°$
$C = 10 + 10j$
$D = 5 - 4j$

Perform the following :   8

(i) ABC   (ii) $\dfrac{AB}{C}$

(iii) AB+CD   (iv) $\dfrac{AB}{CD}$