

3. (a) A 120V, 60W metal filament lamp is to be operated on 220V, 50Hz supply mains. **10**
Calculate what value of
(i) Non-Inductive resistance
(ii) Pure-Inductance
Would be required in order that lamp is run on correct voltage. Which method is preferable and why ?
- (b) If two impedances $Z_1 = (4 + j8)\Omega$ and $Z_2 = (3 - j6)\Omega$ are connected in parallel **10**
with each other and a voltage source of 50Hz, 230Volts is applied across the parallel combination then obtain the following :—
(i) Draw the circuit diagram.
(ii) Current through each branch and power factor of each branch.
(iii) Total current and total power factor.
(iv) Power consumed by each impedance.
(v) Draw the neat phasor diagram.
4. (a) Show that only two wattmeters are sufficient to measure 3 - ϕ power. Also state **10**
advantages of two wattmeter method.
- (b) Draw and explain the input and output characteristic for a transistor common emitter **6**
configuration.
- (c) Explain slip in 3-phase induction motors. **4**
5. (a) A 15 KVA, 2200/110 V transformer has $R_1 = 1.75\Omega$, $R_2 = 0.0045\Omega$. The leakage **10**
reactances are $X_1 = 2.6\Omega$ and $X_2 = 0.0075\Omega$. Calculate :—
(i) Equivalent resistance referred to primary and secondary.
(ii) Equivalent reactance referred to primary and secondary.
(iii) Equivalent impedance referred to primary and secondary.
(iv) Total copper loss.
- (b) Explain transformer tests to find the following parameters of transformer :— **10**
(i) Equivalent resistance as referred to primary.
(ii) Equivalent core-loss resistance.
(iii) Equivalent leakage reactance as referred to primary.
(iv) Magnetizing reactance.
6. (a) How is rotating magnetic field produced in 3 - ϕ induction motor ? (Explain **10**
graphically).
- (b) Draw and explain construction and working of d.c. motor. **10**
7. (a) Explain the working of capacitor filter using waveforms, with reference to full wave **10**
rectifier.
- (b) Calculate the power delivered / power absorbed by each source. Verify power **10**
absorbed is equal to power delivered.

