**Worksheet-14**

**(Three Phase Induction Motor)**

1. If the induced emf in the stator of an 8-pole induction motor has a frequency of 50 Hz and that in the rotor is 1.5 Hz, at what speed is the motor running and what is the slip? **[727.5 r.p.m.]**
2. A three phase, 50 Hz, 4 pole slip ring induction motor has a star connected rotor. The full load speed of the motor is 1460 rpm. The rotor resistance and stand still reactance per phase are 0.1 ohm and 1.5 ohm respectively. The open circuit voltage on open circuit between the slip rings is 90 volts. Determine (i) percentage slip (ii) induced emf in rotor per phase (iii) the rotor reactance per phase at full load (iv) the rotor current and full load power factor. **[2.66; 1.382 V; 1.5 Ω/phase; 12.83 A, 0.929]**
3. A 6-pole, 50-Hz squirrel-cage induction motor runs on load at a shaft speed of 970 r.p.m.

Calculate: - (i) the percentage slip  (ii)  the frequency of induced current in the rotor. **[3%; 1.5 Hz]**

1. An 8-pole alternator runs at 750. r.p.m. and supplies power to a 6-pole induction motor which has at full-load a slip of 3%. Find the full-load speed of the induction motor and the frequency of its rotor e.m.f. **[970 r.p.m.; 1.5 Hz]**
2. A 3-phase, 50-Hz induction motor with its rotor star-connected gives 500 V (r.m.s.) at standstill between the slip-rings on open-circuit. Calculate the current and power factor at standstill when the rotor winding is joined to a star-connected external circuit, each phase of which has a resistance of 10 Ω and an inductance of 0.04 H. The resistance per phase of the rotor winding is 0.2 Ω and its inductance is 0.04 H.  Also, calculate the current and power factor when the slip-rings are short-circuited and the motor is running with a slip of 5 per cent. Assume the flux to remain constant. **[10.67 A; 0.376; 21.95 A; 0.303]**