b) Draw and explain about the open delta connection (V- Connection) of two single phase transformer. **(5)**

Q8 a) A 400 V,4-pole, 50 Hz, 3-phase, star-connected induction motor has the following per phase parameters referred to stator **(10)**

$$R_1 = 0.6\Omega, X_1 = 1.1\Omega, R_2' = 0.3\Omega, X_2' = 0.5\Omega, X_m = 25\Omega$$

The mechanical losses are1000 W and stator core losses are 500 W. The slip is 3%. Using approximate equivalent circuit, find i) speed ii) stator current iii) stator power factor iv) power input to rotor v) gross torque vi) shaft torque vii) efficiency viii) rotor copper loss/ phase. Neglect R_c

b) Explain about the star delta starting of a 3-phase induction motor with neat sketch. **(5)**

Q9 a) The equivalent circuit impedances of a 20-kVA, 8000/240 V, 6O-Hz transformer are to be determined. The open-circuit test and the short-circuit test were performed on the primary side of the transformer, and the following data were taken: **(10)**

Open-circuit test (on primary)		Short-circuit test (on primary)	
V_{oc}= 8000V	I_{oc} = 0.214A	V_{sc} = 489V	I_{sc} = 2.5 A
P_{oc} = 400W		P_{sc} = 240W	

Find the impedances of the approximate equivalent circuit referred to the primary side, and sketch that circuit. Also find the % voltage regulation when supplying a full-load at 0.8p.f. lagging.

b) Explain about the shaded pole starting of a single-phase induction motor with neat sketch. **(5)**