

- (i) Find the equivalent circuit parameter referred to l.v. side. 4
- (ii) efficiency at half load, 0.8 pf. 2
- (iii) maximum efficiency at 0.6 pf. 2
- (iv) voltage regulation at 0.7 pf leading. 2
- 4 Attempt any two parts :
- (a) Explain the principle of operation of three phase synchronous motor. State its applications and compare it with three phase induction motor. 10
- (b) (i) Derive the emf equation of dc machine. 5
(ii) A d.c. generator has an armature emf of 100 V when the useful flux per pole is 20 mWb and the speed is 800 rpm. Calculate the generated emf with a flux per pole of 24 mWb and a speed of 900 rpm. 5
- (c) (i) Discuss any two methods of speed control of d.c. motor. 5
(ii) A 250 V d.c. shunt motor having an armature resistance of 0.25Ω carries an armature current of 50 Amp and runs at 750 rpm. If the flux is reduced by 10%, find the speed. Assume that the load torque remains the same. 5
- 5 Attempt any two parts :
- (a) Explain the generation of rotating magnetic field and the principle of operation of three phase induction motor. 10
- (b) Discuss one method of starting for (i) three phase induction motor (ii) single phase induction motor. 10
- (c) Write short notes on : 10
(i) Stepper motor (ii) Universal motor.

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Paper ID and Roll No. to be filled in your Answer Book

Roll No.

B. Tech.

(SEM. II) EXAMINATION, 2009

BASIC ELECTRICAL ENGG.

Time : 3 Hours]

[Total Marks : 100

- Note : (1) Attempt all the questions.
(2) Use of Graph Papers are permitted.

- I Attempt any four parts of the following :
- (a) Clearly explain the concept of phasor. How a sinusoidal quantity is represented by a complex number ? 5
- (b) Clearly differentiate between active and reactive power. Discuss the term power factor. 5
- (c) For the circuit shown in Fig. 1(c) determine the value of inductance for resonance if $Q = 50$ and $f_o = 175$ kHz. Also find the circuit current the voltage across the capacitor and the bandwidth of the circuit. 5

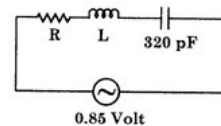


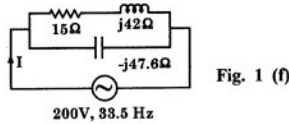
Fig. 1 (c)

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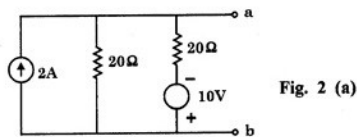
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- (d) A bulb rated at 100 W, 100 V is to be operated on 230 V mains. Find (a) series resistance required (b) series inductance required. 5
- (e) An iron ring of mean length 50 cms has an air gap of 1 mm and a winding of 200 turns. If the relative permeability of iron is 300 when a current of 1 Amp flows through the coil, find the flux density. 5
- (f) For the circuit shown in Fig. 1(f) calculate I and overall power factor of the circuit. 5



- 2 Attempt any two parts of the following : 10
- (a) State and prove maximum power transfer theorem for dc networks. In the circuit shown in fig. 2(a), a variable resistance R_L is connected across the terminals a and b . Calculate the value of maximum power that can be delivered to R_L .



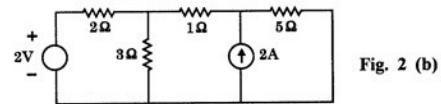
- (b) Calculate the currents in all parts of the network shown in Fig. 2(b) using Mesh 10

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Analysis and verify those results using Node voltage method.



- (c) Explain the construction and working of electrodynamic wattmeter and describe the following in case of measuring instruments : 10
- (i) Damping torque (ii) Controlling torque (iii) Deflecting torque

3 Attempt any two parts :

- (a) (i) Write advantages of three phase system over single phase system. 2
- (ii) Draw the circuit diagram to measure three phase power using two wattmeter and three wattmeter. 3
- (iii) A balanced delta connected load of $(8 + j6) \Omega$ is connected to a three phase 415 V supply. Find line current, power factor, $P_{3\phi}$ and $Q_{3\phi}$. 5
- (b) (i) Explain the working principle of single phase transformer. Discuss its shell type construction and its advantages over core type construction. 5
- (ii) Draw and explain the phasor diagram of single phase transformer for lagging power factor load and step down mode. 5
- (c) The following data are given for 50 kVA, 2400/120 V transformer :
O.C. test readings (l.v. side) 120 V, 9.65 A, 396 W
S.C. test readings (h.v. side) 92 V, 20.8 A, 810 W

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