

**UNIVERSITY OF PUNE**  
**[4361]-104**  
**F. E. Examination - 2013**  
**BASIC ELECTRICAL ENGINEERING**  
**(2012 Course)**

**Total No. Of Questions: 8**

**[Total No. Of Printed Pages: 3]**

**[Time: 2 Hours]**

**[Max. Marks: 50]**

**Instructions:**

- (1) Attempt Q. No. 1 or 2, Q. No.3 or 4, Q. No. 5 or 6, Q. 7 or 8.
- (2) Figure to the right indicate full marks.
- (3) Black figures to the right indicate full marks.
- (4) Neat diagrams must be drawn wherever necessary.
- (5) Assume suitable data, if necessary.

Q. 1. A) What is the insulation resistance? Derive an expression for the (6)

Insulation resistance of a single core cable.

B) Derive an expression for energy stored per unit volume in the magnetic (6)  
field.

**OR**

Q. 2.A) An iron ring has a mean circumference of 180 cm. It carries a current (6)

Of 1.5 Amp and has 600 turns of coil wound over it. The relative

Permeability of the iron is 1200. Calculate 1) MMF 2) Field strength  
and 3) flux density.

B) A piece of silver wire has a resistance of  $3\Omega$ . What will be the (6)

resistance of a manganin wire one-third the length and one- third the

diameter that of silver? The resistivity of manganin is 30 times that of  
silver.

Q.3. A) Derive an expression of R.M.S. value of an sinnsoidally varying (6)  
Current.

B) Derive an expression of EMF induced in a single phase transformer (6)

**OR**

Q. 4. A) An 80KVA, 3200/400v, 50Hz, single phase transformer has III turns (6)

On the secondary calculate 1) No of turns on primary 2) secondary full load current 3) c/s area of the core if the maximum flux density is 1.2 tesla.

B) A  $50\mu\text{F}$  capacitor is connected across a single phase 230v, 50Hz (6)

Supply. Calculate 1) the reactance offered by the capacitor 2) the Maximum current and 3) the rms value of the current drawn by the Capacitor

Q. 5. A) the voltage and current, in simple series circuit are given by (6)

$\bar{V} = 150 \angle 30^\circ$  and  $\bar{I} = 2 \angle -15^\circ$  If the supply frequency is 50Hz, determine, impedance, resistance, reactance and power consumed by the circuit.

B) Derive the relation of line & phase values of voltage and current (7)  
for three phase delta connected balanced load, with phasor .

**OR**

Q. 6. A) sketch and explain the phasor diagrams of R-L-C series CKT. (6)

When 1)  $X_L > X_C$  and 2)  $X_L < X_C$

B) Two circuits, the impedance of which are given by  $Z_1 = (10 + j15) \Omega$  and (7)

$Z_2 = (6 - j8) \Omega$  are connected in parallel across on A.C. supply. If the total

Current supplied is 15 Amp, what are the branch current drawn by two circuits.

Q. 7. A) State and explain kirchhoff's laws. (5)

B) Apply thevenin's theorem to calculate current drawn by 8 ohm (8)

Resistance for the circuit shown in fig.1

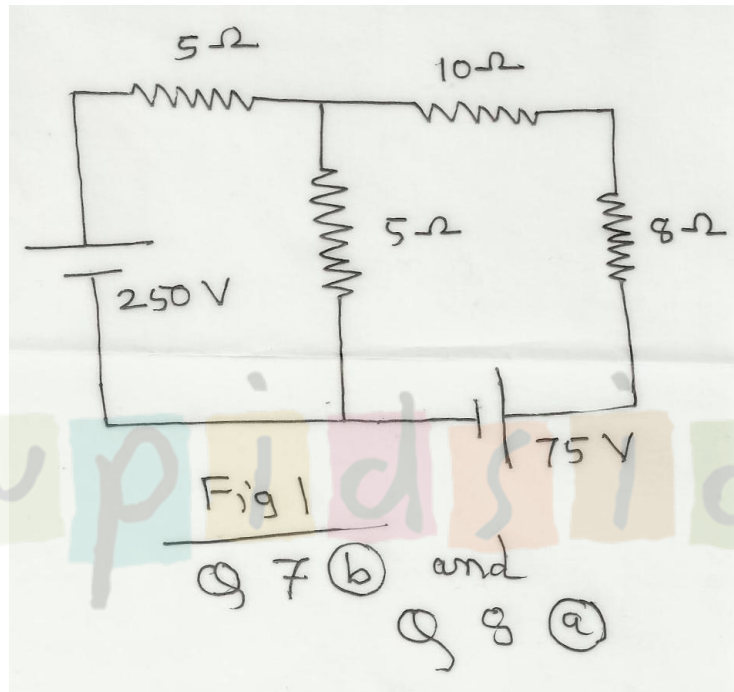


Figure 1 Q.7. B) and Q. 8. A)

**OR**

Q. 8. A) Calculate current flowing in 8 ohm resistance for the circuit shown in (8)

Fig.1 applying superposition theorem.

B) Derive formulae to convert DELTA connected network into its STAR (5)  
connected equivalent network.