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EH-183

B.E. II Semester (CGPA) Civil Engg.

Exam. 2014 604

BASIC ELECTRICAL AND ELECTRONICS ENGG.

Paper : CE - 203

Time Allowed : Three Hours

Maximum Marks : 60

Note: Attempt all questions. Internal choices given in respective questions.

Q.1. Choose any one

10

i) The maximum and minimum values of power factor in an ac circuit can be

a) 1 and 0

b) +1 and -1

c) +1 and -5

d) +10 and -10

ii) A wattmeter measures

a) average active power

b) reactive power

c) apparent power

d) instantaneous power

iii) A circuit has a resistance, an inductor and a diode, the circuit is

a) bilateral

b) passive

c) linear

d) non - linear

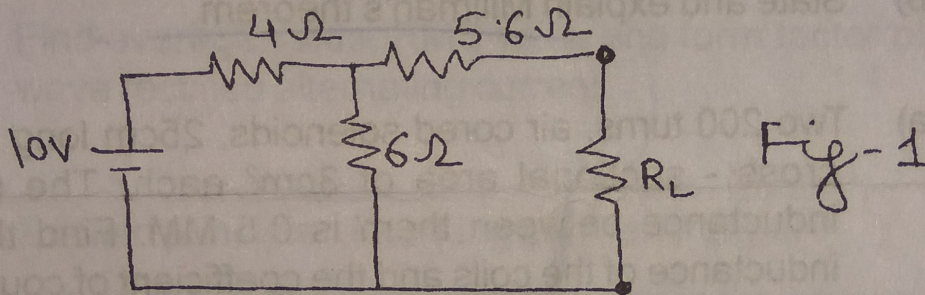
- iv) The property of a magnetic circuit which opposes the formation of flux is known as-
- a) reactance
 - b) mmf
 - c) permeance
 - ~~d)~~ reluctance
- v) Two coils have self - inductances of 10H and 2H, the mutual inductance being zero, If the two coils are connected in series, the total inductance will be -
- a) 6H
 - b) 8H
 - ~~c)~~ 12H
 - d) 24H
- vi) The transformer ratings are usually expressed in terms of
- a) volts
 - b) amperes
 - c) kW
 - ~~d)~~ KVA
- vii) The path of magnetic flux in transformer should have
- a) high resistance
 - b) high reluctance
 - c) low resistance
 - ~~d)~~ low reluctance
- viii) In a dc generator, if p be the number of poles and N be the rpm of rotor, then the frequency of magnetic reversals will be
- a) $\frac{NP}{2}$
 - ~~b)~~ $\frac{NP}{60}$
 - c) $\frac{NP}{120}$
 - d) $\frac{NP}{3000}$
- ix) By looking at which part of the motor it can be easily confirmed that a particular motor is dc motor?
- a) frame
 - b) shaft
 - ~~c)~~ commutator
 - d) stator

(3)

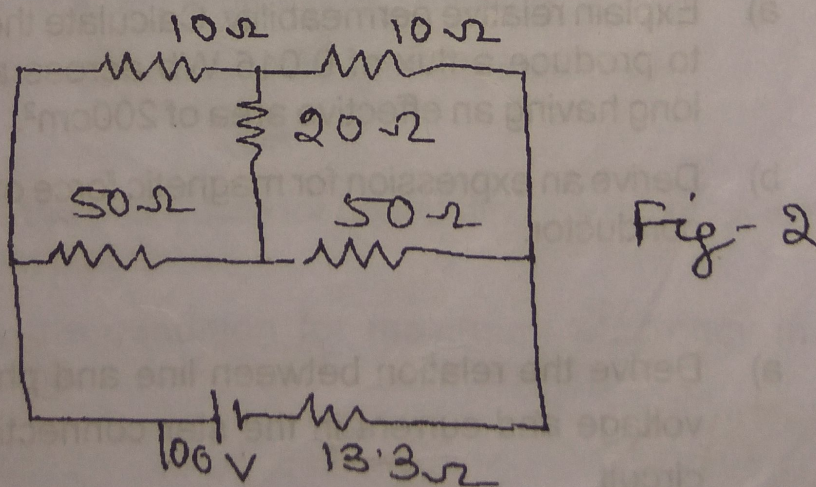
x) In a pure LC parallel circuit under resonance condition, current drawn from the supply mains is

- a) very large b) $V\sqrt{LC}$
 c) $\frac{V}{\sqrt{LC}}$ d) zero

Q.2. a) Explain maximum power transfer theorem. Find the value of R_L and P_L under maximum power transfer condition in Fig.1. 5



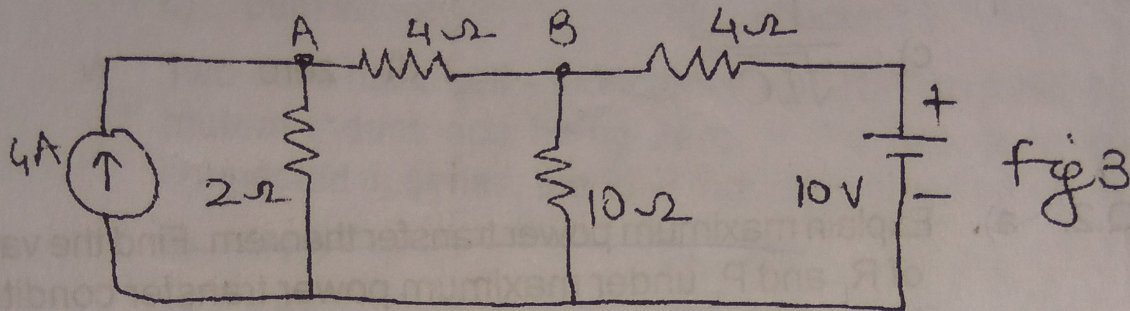
b) Find the current and power supplied by battery for the circuit shown in Fig.2. Using loop analysis. 5



(4)

OR

- a) Determine the current through the branch AB in the circuit shown below in Fig.3. Using nodal analysis. 5



- ~~b)~~ State and explain Millman's theorem. 5

- Q.3. a) Two 200 turns, air cored solenoids, 25cm long have a cross - sectional area of 3cm^2 each. The mutual inductance between them is 0.5 MM. Find the self inductance of the coils and the coefficient of coupling. 5

- ~~b)~~ Explain leakage flux and fringing in magnetic circuits. 5

OR

- a) Explain relative permeability. Calculate the mmf required to produce a flux of 0.015 Wb across air gap 2.5mm long having an effective area of 200cm^2 . 5

- b) Derive an expression for magnetic force of a long straight conductor. 5

- Q.4. a) Derive the relation between line and phase values of voltage and current in the star connection of 3ϕ AC circuit. 5

(5)

- b) A series RLC circuit has $R = 1 \Omega$, $L = 0.03H$, $C = 3MF$ and $v = 10$ v. Find 5

- i) resonant frequency ii) Q - Factor
iii) Band width iv) resonance current

OR

- a) Two impedances $z_1 = (150 - j5) \Omega$ and $z_2 = (100 - j110) \Omega$ are connected in parallel at 200V, 50Hz supply. Find-

- i) i_1, i_2 ii) total current
iii) total power iv) pf. of circuit 5

- b) Find average value, RMS value and form factor of half wave rectified alternating current. 5

Q.5. a) Explain principle of working of a transformer? 5

- b) A 1-phase transformer has 80 turns in the primary and 400 turns in the secondary winding. The net cross sectional area of the core is 50cm^2 . If the primary winding is connected to 240V, 50Hz supply. Determine

- i) emf induced in secondary winding.
ii) maximum value of flux density in core. 5

OR

- a) Explain the procedure for conducting transformer tests with neat diagrams. 5

- b) Derive the condition for maximum efficiency in a transformer. 5

Q.6. a) Write a short note on "Armature reaction". 5

(6)

- b) A 4-pole, lap-wound, dc shunt generator has a useful flux/pole of 0.08 wb. The armature winding consists of 260 turns, each of resistance 0.006Ω . Determine the terminal voltage of the generator. When it is running at 1000 rpm and supplying a load current of 55A. 5

OR

- a) Explain the construction of DC machine with a neat diagram. 5
- b) Explain principle of operation of a DC motor. 5

