SVKM's NMIMS
MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Programme:MBA Tech (ALL STREAMS) Year: I Semester: I

Academic Year: 2015 - 16

Batch:2014-15

Subject :Basic Electrical Engineering

Date : 30/11/2015

Marks:60
Time :10.00 am - 1.00 pm
Durations:3 (hrs)

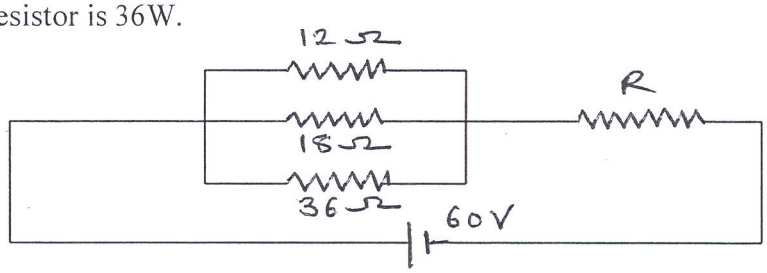
Re-Examination

Instructions: Candidate should read carefully the instructions provided on the question paper and on the cover of the answer book which is provided for their use.
NB:

1. Question No. 1 is compulsory.
2. Out of remaining questions, attempt any FOUR questions.
3. In all FIVE questions to be attempted.
4. All questions carry equal marks.
5. Answer to each new question to be started on a fresh page.
6. Figures in brackets indicate full marks.

Q. 1. Attempt any four of the following. (12)

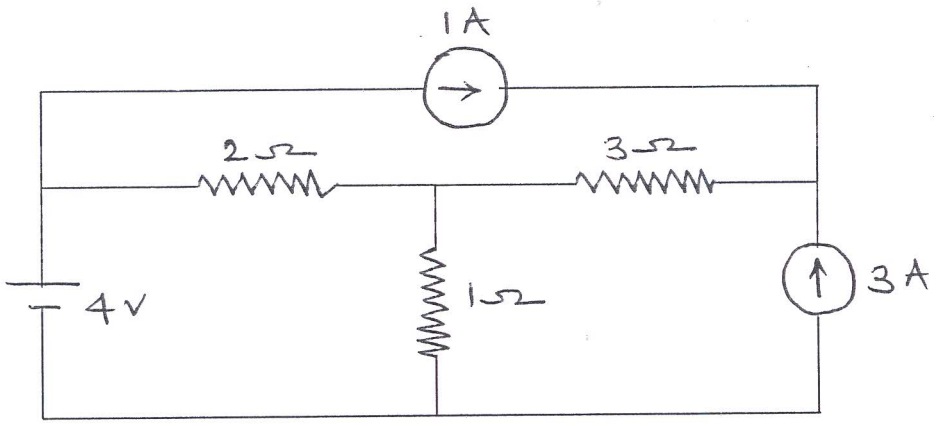
a) For the circuit shown below, find the value of resistance R, when power consumed by 12Ω resistor is 36W.



b) The equation of an alternating current is i= 62.35 sin 323t A. Determine (i) maximum value, (ii) frequency, (iii) rms value, (iv) average value, (v) form factor.
c) Compare magnetic circuit with electric circuit.
d) Derive the condition for maximum efficiency of 1Φ Transformer.
e) Why 1Φ Induction motor is not self starting?

Q. 2. Attempt the following.

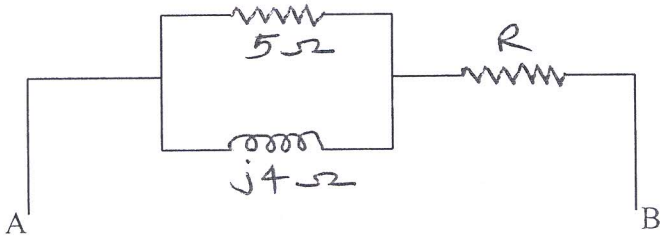
a) A current of 5 A flows through a non-inductive resistance in series with a choking coil supplied at 250 V, 50 Hz. If the voltage across the resistance is 125 V and across the coil 200 V, calculate (i) Impedance, reactance, and resistance of the coil, (ii) Power absorbed by the coil, (iii) Power factor of the coil. Also draw the phasor diagram. (6)
b) State superposition theorem. Determine the current in 1Ω resistor in the following network using superposition theorem. (6)



Q.3. Attempt the following.

a) Derive the relationship between line voltage and phase voltage, line current and phase current for a star connected balanced load across a 3Φ balanced system. Draw the complete phasor diagram. (6)

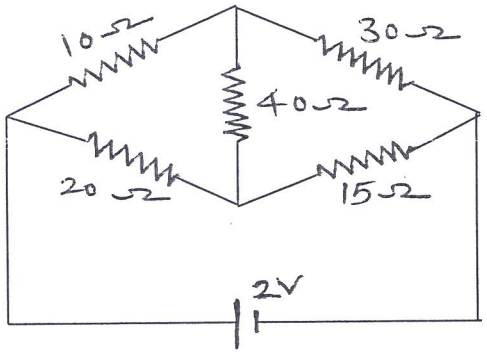
b) The voltage of 150 V applied between terminals AB, produces a current of 32 A for the circuit shown below. Find the value of R and the power factor of the circuit. (6)



Q.4. Attempt the following.

a) Explain with neat diagram the constructional details of DC Motor (6)

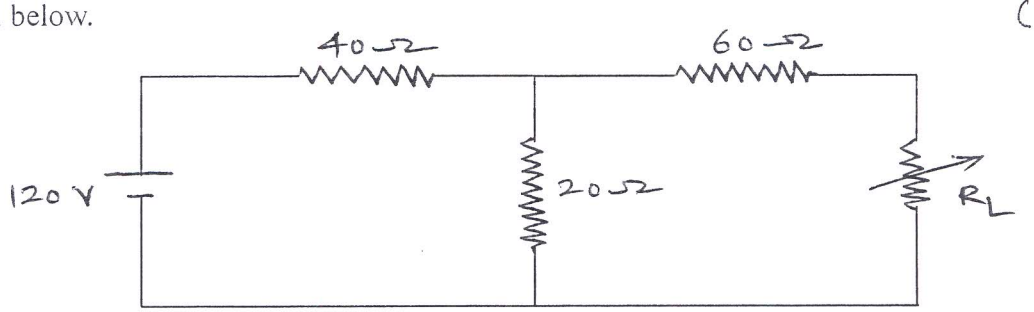
b) By Thevenin's theorem find the current in the 40 Ω resistor in the network shown below. (6)



Q.5. Attempt the following.

a) A voltage of v= 10 sin ωt is applied to R-L-C circuit. At resonance frequency of the circuit, the maximum voltage across the capacitor is found to be 500 V. Moreover the bandwidth is known to be 400 rad/sec. and impedance at resonance is 100 Ω. Find (i) The resonant frequency, (ii) Upper and lower limits of Bandwidth, (iii) Value of L and C. (6)

b) Derive the condition for maximum power transfer in a DC circuit. Calculate the value of R_L for it to absorb the maximum power and find out the maximum power in the circuit given below. (6)



Q.6. Attempt the following.

a) Compare Core type transformer with Shell type transformer (At least 4 points). A 80 KVA, 3200/400 V, 1Φ, 50 Hz transformer has 111 turns on the secondary winding. Calculate (i) Number of turns on primary winding, (ii) Secondary full load current, (iii) Cross-Sectional Area of the core, if maximum flux density is 1.2 Tesla. (6)

b) Open circuit and short circuit test on a 5 KVA 200/400 V, 1Φ, 50 Hz transformer gave the following results: (6)

OC Test	200 V	1 A	100 W	Carried on LV side
SC Test	15 V	10 A	85 W	With Primary Short Circuited

(i) Draw the equivalent circuit referred to the primary,
(ii) Calculate the approximate regulation of a transformer at full load 0.8 pf lagging.

Q.7. Attempt the following.

a) A steel ring of 30 cm mean diameter and circular cross section 2 cm in diameter has an air gap 1 mm long. It is wound uniformly with 600 turns of wire carrying 2.5 A current. Find (i) Total MMF, (ii) Total Reluctance, (iii) Magnetic Flux. Neglect magnetic leakage. The iron path takes 40% of total MMF. (6)

b) A magnetic circuit is arranged as shown in the figure below. The central limb has a cross sectional area of 8 cm^2 and each of the side limbs has a cross sectional area of 5 cm^2. Calculate the ampere-turns required to produce a magnetic flux of 1 mWb in the central limb assuming negligible magnetic leakage. H=500 AT/m at B=1.25 Wb/m^2 and H=200 AT/m at B=1 Wb/m^2 . (6)