UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2012/2013

COURSE NAME	:	ELECTRICAL POWER TRANSMISSION AND DISTRIBUTION SYSTEM
COURSE CODE	:	BEK 4213 / BEX 44603
PROGRAMME	:	BEE
EXAMINATION DATE	:	JUNE 2013
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1 An overhead line conductor is supported at a water crossing from two towers, the heights of the supports being 30 m and 35 m above water level, with a horizontal span of 300 m. The conductor weight is 8.5 N/m and its tension should not exceed 2.5×10^4 N.

(i) Sketch and label the overhead line system describe above
(ii) Determine clearance between lowest point of conductor and water
(iii) Determine horizontal distance of the clearance point from lower support
(iv) Estimate the maximum horizontal span of the tower to make the clearance between lowest point of conductor and water not less than 20m

(20 marks)

Q2 A three-phase, 50 Hz, 132 kV overhead line has conductors placed as shown in Figure Q2. Conductor diameter is 3 cm and the line length is 120 km. Assumed the line is completely transposed and neglecting the effect of ground.

(i) Determine the capacitance of the transmission line per phase
(ii) Determine the reactive power from charging the capacitance

(15 marks)

Q3 A three-phase AC transmission line with a frequency of 50 Hz has total line length is 150 km. The resistance per phase is 0.03 Ω/km and inductance per phase is 0.8 mH/km. The shunt capacitance is 0.005 μF/km. The receiving end load is 49 MVA with 0.85 power factor lagging at 138 kV.

(i) Sketch and label the equivalent circuit that suitable for this transmission line
(ii) Determine the sending-end voltage and the voltage regulation
(iii) Determine efficiency of the transformer

(25 marks)

Q4 (a) Explain briefly advantages of a direct laying method for underground cables

(3 marks)

(b) Three 35 kV, 350 kcmil, single conductor belted underground cable are located in touching equilateral formation with respect to each other and sheaths are bounded to ground at several points. The cables are operated at 12 kV and 50 Hz with a conductor diameter of 0.681 in., insulation thickness of 0.345 in, lead sheath thickness of 0.105 in and a length of 20 mile. Conductor ac resistance is 0.190 Ω/mi per phase at 50^0C.

(i) Calculate mutual reactance between conductor and sheath per phase
(ii) Calculate sheath resistance of cable per phase
(iii) Calculate total resistance of conductor include sheath losses
(iv) Estimate total sheath losses of feeder if current in conductor is 200A

(17 marks)

Q5 **(a)** State three types of electrical distribution system according to the scheme of connections

(3 marks)

(b) A single-phase ring distribution system is shown in Figure Q5. The load at point K is 40 A at 0.8 PF lagging and at point L is 60 A at 0.6 PF lagging. Both power factor expressed are referred to voltage at point M. The total impedance of the section MK is 2+j1 Ω, the section KL is 2+j3 Ω and the section LM is 1+j2 Ω. Evaluate this distribution network and determine the current in each section I_{MK} , I_{KL} and I_{LM}

(17 marks)

- END OF QUESTION -

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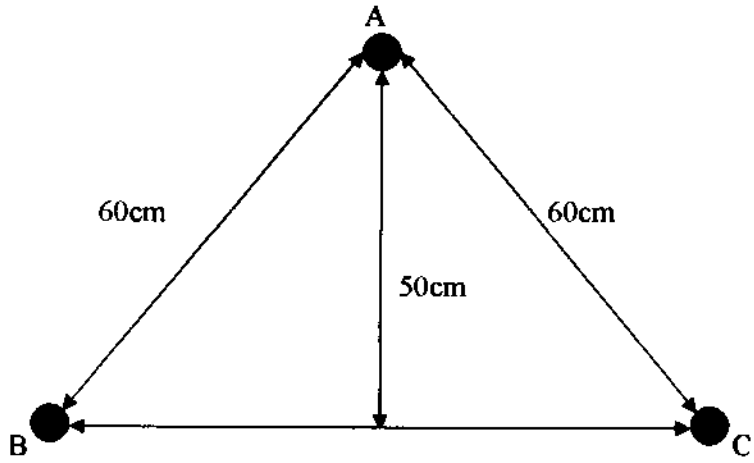

FIGURE Q2

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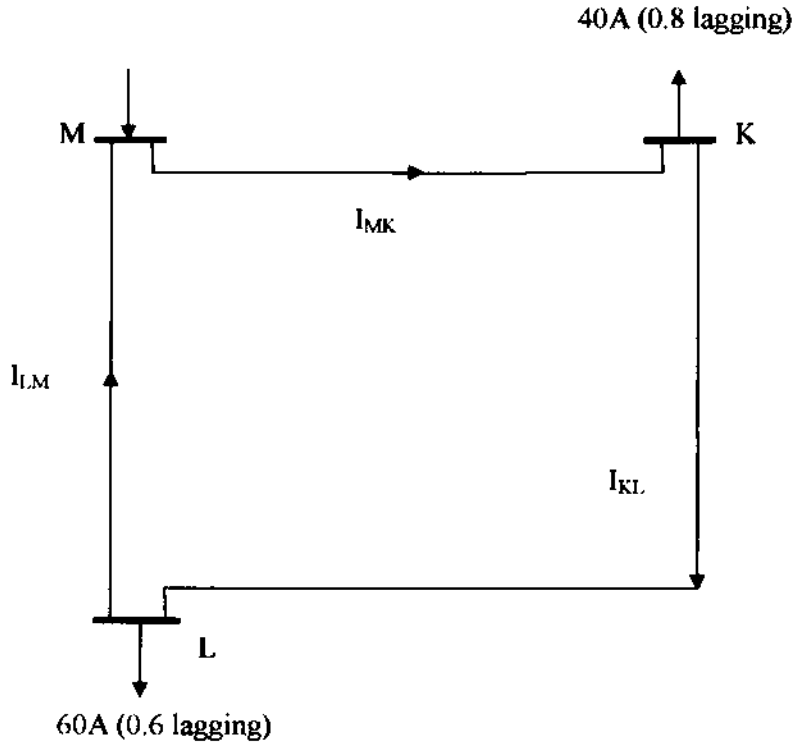

FIGURE Q5