LAGOS CITY POLYTECHNIC, IKEJA

SCHOOL OF ENGINEERING & APPLIED SCIENCE

DEPARTMENT OF ELECTRICAL/ELECTRONICS ENGINEERING

2015/2016 SEMESTER EXAMINATION

COURSE TITLE: ELECTRICAL CIRCUIT THEORY 1
NO OF QUESTION : 6
COURSE CODE: EEC 239/EEC 232
TIME ALLOWED: 2 HRS
FOR WHOM: ND YR II EE/CE PT
INSTRUCTIONS: ATTEMPT ANY 4 QUESTIONS

1. (a) State the Trigonometric form and polar form of representing AC signals respectively.
   (b) Express $5<53.1^{o}$ in j-notation form.
   (c) If $V_1 = 10 + j20$ and $V_2 = 20 + j30$, find the sum of V_1 and V_2, express the result in polar form.
   (d) Given the following two vectors $A = 20<60^{o}$ and $B = 5<30^{o}$ perform the following indicated operation (i) A x B (ii) A/B

2. (a) Explain why it is most convenient to multiply or divide by first of all converting to polar form?
   (b) With the aid of a waveform, differentiate between purely inductive circuit and purely capacitive circuit.
   (c) Draw the phasor diagram for Inductive circuit and capacitive circuit
   (d) When is an A. C circuit said to be in Resonance?

3. (a) A resistance of 10Ω is connected in series with pure inductance of 100MH and the circuit is connected across a 100v, 50HZ supply. Calculate
   (i) the circuit current (ii) the voltage across each element
   (iii) the power factor of the circuit
   (iv) the power consumed.
   (b) Draw the phasor diagram for R-L-C series A.C circuit

4. (a) A circuit having a reistance of 1256, an inductance of 0.15H and a capacitance of 100μF in series, is connected across a 100v, 50HZ supply.Calculate
   (a) the impedance (b) the current
   (c) the voltage across R, L and C (d) The power factor of the circuit.

5. (a) A circuit consists of a 115Ω resistor in parallel with a 41.5μF capacitor and is connected to a 230v, 50HZ supply. Calculate
   (i) The branch currents (ii) The power factor (iii) The power consumed
   (b) Give the 5 conditions for series resonance of A.C circuit.

6. (a) The bandwidth of a series resonance circuit is 130HZ and the resonance frequency is 1300HZ, find the Q-factor of the circuit.
   (b) State Thevenins Theorem (c) State Nortons Theorem
   (d) Apply Thevenins Theorem to find the current through the Resistance R as Shown in