

**LAGOS CITY POLYTECHNIC, IKEJA**  
**SCHOOL OF ENGINEERING AND APPLIED SCIENCE**  
**DEPARTMENT OF ELECTRICAL ENGINEERING**  
**2015/2016 SEMESTER EXAMINATION**

<b>COURSE TITLE:</b> ELECTRICAL INSTRUMENTATION II	<b>NO OF QUESTIONS :</b> 6
<b>COURSE CODE:</b> EEC 235/236	<b>TIME ALLOWED:</b> 2 HRS
<b>FOR WHOM:</b> ND YR III EE, CE	<b>PT INSTRUCTIONS:</b>
<b>ANSWER ANY</b>	

**FOUR QUESTIONS**

1. A coil consists of a resistance of  $100\Omega$  and an inductance of  $200\text{mH}$ . If an alternating voltage,  $V$  is given by  $V = 200 \sin 500t$  (v) is applied across the coil, Calculate.
  - (a) the circuit impedance
  - (b) the current flowing
  - (c) the potential difference across the resistance and inductance
  - (e) the phase angle between voltage and current
  
2. (a) Derive an expression for the balanced load lagging power factor meter  
 (b) A 3-phase  $415\text{V}$  motor load has a load output of  $30\text{Hp}$ , the power factor being  $0.4$  with full load efficiency  $74.6\%$ . Find the reading on each of the two wattmeter connected to measure the input.
  
3. (a) Two wattmeter indicates  $10\text{kW}$  and  $3\text{kW}$  respectively when connected to measure the input power to a 3-phase balanced load the reverse switch being operated on the meter indicated  $3\text{kW}$  reading. Determine  
 (i) the input power (ii) the load power factor.  
 (b) List and explain four(4) uses of CRO
  
4. (a) Draw the block diagram of Cathode Ray Oscilloscope  
 (b) A cathode Ray Oscilloscope has a time base and signal amplitude control switch being set at  $100\mu\text{s/cm}$  and  $20\text{V/cm}$  respectively to produce a square wave form having a width of one complete cycle as  $5.2\text{cm}$  on the screen. If the peak to peak height of the wave form is  $3.6\text{cm}$  then. Calculate the  
 (i) Periodic time (ii) frequency (iii) peak voltage  
 to (iv) Amplitude of the waveform (v) R.M.S voltage value
  
5. (a) Draw and explain the construction of a dynamometer wattmeter  
 (b) A dynamometer type wattmeter with its voltage coil connected across the loadside of the instrument reads  $250\text{W}$ . If the load voltage is  $200\text{V}$ , what power is being taken by load? The voltage coil branch has a resistance of  $2000\Omega$ .
  
6. (a) List and explain 6 factors of the instrument selection in three(3) major classes of instrument.  
 (b) Explain the importance of humidity measurement in an industry.  
 (c) Find the power factor of a motor, when its output power is  $3024\text{W}$  and the current is  $18\text{A}$  from a source voltage of  $240\text{V}$

