



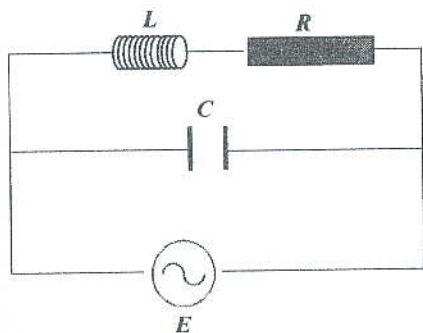
PH 104 AC THEORY

Time: 01 hour

Answer ALL Questions

1. Explain the use of complex quantities in the solution of an alternating current problems.

(10 marks)



As shown in the above figure a coil of inductance L and resistance R is connected across the terminals of a capacitor of capacitance C and an alternating voltage $E = E_0 \sin \omega t$ is applied across these same terminals.

a) Determine the magnitudes and phases of the currents in the circuit and the current drawn from the voltage source.

(30 marks)

b) Show that the potential difference across the coil will be in phase with the current from the source when

$$R^2 = \frac{L}{C} (1 - \omega^2 LC)$$

(30 marks)

c) Under what conditions will the current through the capacitor be in phase with the current from the source?

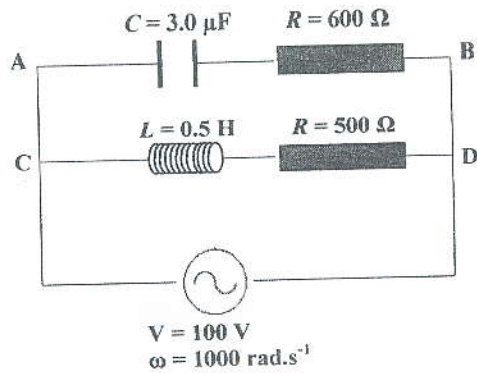
(30 marks)

2. Derive an expression for the complex impedance of the following passive elements when the alternating voltage of $V = V_0 e^{j\omega t}$ is applied across each element.

a) resistor; (10 marks)

b) capacitor; (10 marks)

c) inductor. (10 marks)



Consider the circuit shown in above figure. The amplitude voltage of the source and its angular frequency is 1000 rad.s^{-1} . The values of the passive circuit elements shown in the figure. Determine

a) the complex impedances Z_1 and Z_2 across the branches AB and CD respectively (20 marks)

b) the complex equivalent impedance Z of the circuit (10 marks)

c) the current I , that passes through the source (20 marks)

d) the complex currents I_1 and I_2 through the branches AB and CD respectively (20 marks)

- b) Fill the column “**Stream**” using suitable excel function according to the following conditions. If the column “**Registration No**” consist “**PHY**”- Physical Science and “**BIO**”- Bio Science.
- c) Fill the column “**Index No**” using suitable excel function according to the following conditions. If the Stream is **Physical Science** then the Index No begins with “**PS**” and add value **3000** with Registration No. If the Stream is **Bio Science** then the Index No begins with “**BS**” and add **2500** with Registration No.

Eg:

Registration No	Index No
EU/IS/2014/PHY/10	PS3010
EU/IS/2014/BIO/11	BS2511
EU/IS/2014/BIO/12	BS2512

- d) Calculate the **Total Marks** for each Student by using the following equation.
 Total Marks = 20% of the Part A + 30% of the Part B + 50% of the Part C
- e) Use the following criteria to fill the “**Grade**” column using suitable excel function.

Total Marks	Grade
Total Marks ≥ 65	Good
$65 >$ Total Marks ≥ 50	Satisfactory
Total Marks < 50	Fail

- f) Create a Column Chart that shows the **Total Marks** by each Student’s **Index No** and insert “**Exam Results**” as the title of the chart.

Q3.

By using “MS PowerPoint 2013” create the following presentation as shown below and save it as “CC152power.pptx” on your Index No folder created in the Desktop. Presentation related image is available on your desktop.

- Type your Index number in the title slide.
- Apply the theme “Ion Boardroom” to all slides.
- Insert the slide number as the footer except the title slide.

- d. Add transition effect between slides.
- e. Add animation effects to the text and object in each slide.

