

**INDIAN MARITIME UNIVERSITY**  
**(A Central University, Govt of India)**

B.Sc Nautical Science, Semester – II  
December 2017 End Semester Examination

**APPLIED PHYSICS & ELECTRICITY**

**Subject Code: UG21T 3202**

Date: 05.12.2017

Time: 3 Hrs

Max Marks: 70

Pass Marks: 35

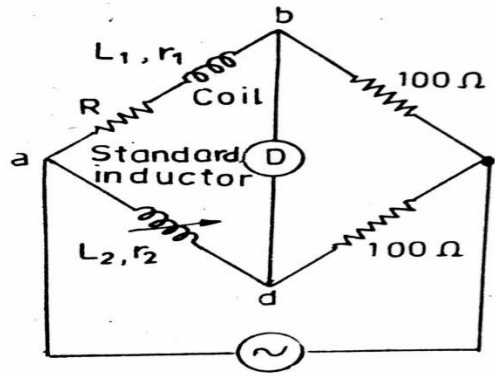
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Note: Attempt any SEVEN questions. All questions carry equal marks. (7x10=70 Marks). Use of non-programmable scientific calculator is allowed.

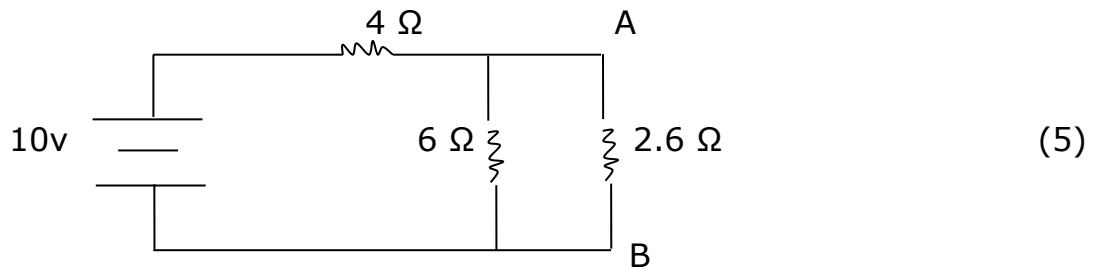
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**PART- A**

1. a) State the laws of electromagnetic Induction?  
What do you mean by coefficient of coupling? (5)  
b) What is self Induction? Obtain an expression for the self inductance of a solenoid
- 2 . a) Distinguish between AC and DC voltage? (2)  
Three capacitors of capacities  $C_1$ ,  $C_2$  and  $C_3$  are connected in parallel. Find the equivalent capacitance of the combination? (3)  
b) Obtain an expression for power in an AC circuit?  
Define power factor? (5)
3. a) Describe Maxwell's L.C bridge for the measurement of inductance of a coil in terms of capacitance and resistance? (5)  
b) A Maxwell's inductance comparison bridge is as in fig. The arm ab consists of a coil with inductance  $L_1$  and resistance  $r_1$  in series with a non-inductive resistance 'R'. The arm bc and cd are each a non-inductive resistance of  $100\Omega$ . The arm ad consist of a standard variable inductor  $L_2$  of resistance  $32.7\Omega$ . Balance is obtained when  $L_2 = 47.8$  mH and  $R = 1.36\Omega$ . Find the resistance of the coil in arm ab. (5)



4. a) State and prove maximum power transfer theorem.  
 b) State and explain Kirchoff's Laws? (5)
5. a) State and explain Thevenin's Theorem? (5)  
 b) Find the Thevenin's equivalent of the circuit shown in fig. Then calculate the current through  $2.6 \Omega$ .



6. a) With necessary theory and sketch, explain the working of AC generator?  
 b) Explain the Principle and working of a DC generator (5)
7. a) Write a note on Thermoelectric effect? (5)  
 b) A 200 KVA, 3300/240 volt 50Hz single phase transformer has 80 turns on secondary winding. Assuming an ideal transformer, calculate  
 (i) Primary and secondary currents (5)  
 (ii) The number of primary turns.
8. a) Obtain an expression for current in series LCR circuit in AC? (5)  
 b) A resistance of 5 ohm, an inductance of 10mH and a capacitor of  $200\mu F$  in connected in series and the combination is connected across a 230v, 50 Hz supply. Calculate the current flowing through the circuit and the power factor? (5)
9. a) What is a transducer? What are the different types of transducers? (5)  
 b) Write a note on Thermistor? Give its uses? (5)

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