

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

June 2017 End Semester Examinations  
Diploma in Nautical Science – First Semester

**Applied Electricity & Electronics – UD11T 1103)**

(Aug' 2009 to Feb' 2012 batches only)

Date: 17.06.2017

Maximum Marks : 70

Time: 2 Hrs

Pass Marks : 25

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**Note:**

- i. Non – programmable scientific calculator is allowed.
  - ii. Attempt **three** questions from each section.
  - iii. Question no. 1 and 5 are **compulsory**.
  - iv. In all you have to attempt six questions.
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**SECTION A**  
**(ELECTRICITY)**

1. a) What is Static Electricity and how it is generated? (2 + 3)
- b) A 50 hertz single – phase transformer has 6600 volt / 400 volt. Having an emf per turn is 10 volt and the maximum flux density in the core is 1.6 tesla. Find the
- i. Suitable number of primary and secondary turns.
  - ii. Cross – sectional area of the core. (5 marks)

***Answer any three from the following the three questions***

2. a) A 100 volt, 50 hertz supply is applied across the series circuit consisting of  $R = 10$  ohm,  $L = 1$  milli henry and  $C = 20$  micro farad. Find the input current and voltage across each element. (5 marks)
- b) What is the effect of temperature rise on resistance of pure metal, alloys and insulators? (5 marks)
3. a) With neat sketch explain how the emf is generated in a D.C. generator? (5 marks)
- b) A capacitor consists of two similar square aluminum plates, each  $10\text{ cm} \times 10\text{ cm}$  mounted parallel and opposite each other. What is their capacitance, when the distance between them is 1 cm and the dielectric air? If the capacitor is given a charge of  $500 \times 10^{-12}$  coulomb, what will be the difference of potential between the plates? (5 marks)

4. a) How a moving coil galvanometer is used as an ammeter with a neat sketch and necessary equations. (5 marks)
- b) Explain the magnetic effect of electric current with reference to magnetic field due to long solenoid. (5 marks)
5. a) Derive the expression for inductances connected in series. (5 marks)
- b) State and explain Kirchoff's laws with example. (5 marks)

**SECTION B**  
**(ELECTRONICS)**

6. a) Describe the basic operation of a transistor biased for active – region operation. (5 marks)
- b) What are the advantages of transistor? (5 marks)
- c) A transistor is connected in common emitter configuration in which collector supply is 8 volt and the voltage drop across the resistance  $R_c$  connected in the collector circuit is 0.5 volt. The value of  $R_c = 800$  ohm. If  $\alpha = 0.96$ , determine:
- i. Collector – Emitter Voltage.
  - ii. Base Current. (5 marks)

***Answer any two from the following three***

7. a) Define piezoelectric effect. Explain the working of quartz crystal. (2 + 3)
- b) How the light energy is emitted from LED when it is forward biased? (5 marks)
8. a) Define polarization and reception. (2.5 + 2.5)
- b) Calculate the radio horizon, when the transmitting antenna height is 100 meter and receiving antenna height is 25 meter. (5 marks)
9. Write a short notes on any **two** of the following: (2x5 = 10)
- a) LC tank circuit
  - b) Sky waves
  - c) RADAR

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