

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

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

Applied Electricity & Electronics – UD11T 2103

(Aug' 2012 to Feb' 2015 batches only)

Date: 16.06.2017

Time: 2 Hrs

Maximum Marks : 70

Pass Marks : 25

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 both sections you have to attempt six questions.
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SECTION A
(ELECTRICITY)

1. (a) Two wires having equal lengths and made of the same material have resistance of 25Ω and 49Ω respectively. Find their relative diameters. (5 m)
- (b) What is static electricity and how it is generated? Is static electricity hazardous? (2+3+5 m)

Attempt any three questions from the following four questions

- 2 (a) A 10 mF, a 20 mF and a 40 mF capacitor are connected in series to a 399 volts source of emf. (5 m)
 - i. What is the equivalent capacitance?
 - ii. What is the magnitude of charge across each capacitor?
 - iii. What is the potential difference across each capacitor?
- (b) Define the following terms (5 m)
 - i. Average value of AC
 - ii. RMS value of AC
 - iii. Form Factor
 - iv. Peak Factor
 - v. Angular Frequency

3 (a) With neat sketch, explain the working principle of transformer. (5m)

(b) Two coils having 800 and 500 turns are magnetically coupled. When a current of 2.4 ampere is flowing in first coil produces a flux of 12 mWb in it and 90% is linked with second coil. If the current of 2.4 ampere is reversed uniformly in 0.2 second, what will be the average emf in each coil? (5m)

4 (a) What do you mean by an ideal ammeter and an ideal voltmeter? How do you convert given galvanometer into an ammeter and a voltmeter? Explain with necessary circuit diagram. (5m)

(b) A coil having a resistance of 12Ω and an inductance of 0.1 H is connected across a 100 V, 50 Hz supply. Calculate

- i. Reactance and impedance of the coil
- ii. The Current (5m)
- iii. The phase difference between the current and applied voltage and draw also the phasor diagram showing voltage and current.

5. a). AC supply having the instantaneous value of current is $i = 10 \sin \omega t$. Having frequency 50 Hz.

Calculate i). Amplitude ii). Time Period iii). Rms value and average and average value

b). Explain the terms kW, kVAR, kVA for an AC circuit and state the relation between them. (10 m)

SECTION – B

6

- a). Explain CB amplifier using NPN transistor with necessary diagram.
- (b) A transistor in common emitter mode has collector supply voltage of 12 V and voltage drop across the 1.2 K Ω load resistance is 1.2 V. Determine the collector to emitter voltage and the base current if $\alpha = 0.9$. (5m)

Attempt any two questions from the following three questions

7. (a) What is frequency modulation? Give the comparison of frequency modulation and phase modulation. (5m)
- (b) A carrier wave with amplitude of 100 V is modulated by a signal of amplitude 40 V. what is modulation factor? What are the amplitudes of lower and upper side band frequencies? (5m)
8. (a) Explain the working of radio transmitter with necessary block diagram. (5m)
- (b) The resonant circuit of tuned oscillator has a resonant frequency of 2.6 MHz. If the value of the inductance is 4 mH, determine the value of the capacitance required. (5m)
9. Write short notes on any two of the following (5+5)
- (a) Pressure Transducer
 - (b) Temperature Transducer
 - (c) Seven segment display
