

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)
End Semester Examination Dec 2019/Jan 2020
DNS - Diploma in Nautical Science
Semester -I
UD11T1103- Applied Electricity and Electronics

Date: 11.12.2019

Time: 2 Hours

Max Marks: 70

Pass Marks: 25

Note:-

- i. Non programmable scientific calculator is allowed.
- ii. Attempt three questions from each section. **Q.1** and **Q.5** are compulsory.
- iii. Attempt any six questions.

PART – A
(Electricity)

- Q.1 a) Explain principle, construction and working of a DC generator, with help of a neat labeled diagram. (10 marks)
- b) A platinum coil has a resistance of 3.146Ω at 40°C and 3.767Ω at 100°C . Find the resistance of the coil at 0°C and also, find the temperature coefficient of resistance, at 40°C . (5 marks)

Answer any two of the following

- Q.2 a) Define capacitance of a capacitor. Derive expressions for equivalent capacitance of capacitors, connected in series and parallel combination, respectively. (5 marks)
- b) What is static electricity? State its hazards. (5 marks)
- Q.3 a) What is induced emf? State Faraday's laws of electromagnetic induction and also state Lenz's law. (5 marks)
- b) Calculate the magnitude of mutual inductance between two coils when a current of 4A, changes to 8A in 0.5 seconds in one coil and induces an emf of 50mV to the other coil. (5 marks)
- Q.4 a) Explain the use of a galvanometer as a voltmeter, with diagram. (5 marks)
- b) A parallel plate capacitor consists of two metal plates of area 60cm^2 each, separated by a dielectric of 1.5mm thickness and of $\epsilon_r = 3.5$. If a potential difference of 1000V is applied across it, calculate the capacitance and energy stored between the plates. (5 marks)

PART – B
(Electronics)

- Q.5 a) Discuss transistor as a basic CE amplifier with help of a circuit diagram.
Determine 'gain' in the amplifier. (10 marks)
- b) Differentiate between amplitude, frequency and phase modulation. (5 marks)

Answer any two of the following

- Q.6 a) Write a note on light dependent resistor (LDR). (5 marks)
- b) The collector supply voltage in a CE amplifier is 10V. The voltage drop across the load resistor of $1.2\text{k}\Omega$ is 1.2V. If α of the transistor is 0.93, determine- (5 marks)
- i) Collector to emitter voltage
 - ii) Base current.
- Q.7 a) What is antenna? Explain a Yagi-Uda antenna with a neat diagram. (5 marks)
- b) Determine the operating frequency and feedback fraction for a Colpitt's oscillator with $C_1 = 0.001\mu\text{F}$, $C_2 = 0.01\mu\text{F}$ and $L = 15\mu\text{H}$. (5 marks)
- Q.8 a) Explain the working of a superheterodyne radio receiver, with help of proper block diagram. (5 marks)
- b) Define LED. Explain its applications in 7-segment display. (5 marks)
