INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

End Semester Examination December 2017

Programme Name: B.Sc (Nautical Science) **Semester**: II

Subject Name: Nautical Physics-IV **Subject Code**: UG21T2206

Date: 28.12.2017 **Maximum Marks**: 70

Time: 3Hrs

Note: Answer any 7 questions. All question carries equal marks (7x10=70 Marks)

1. (a) Explain construction of P-N junction diode & show the characteristics curve of a diode (5)
   (b) Define a rectifier circuit. Explain half wave rectifier circuit in details. (5)

2. (a) A half wave rectifier is used to supply 50V d.c. to a resistive load of 800Ω. The diode has a resistance of 25Ω. Calculate a.c. voltage required. (5)
   (b) A full wave rectifier uses two diodes; the internal resistance of each diode is 20Ω. The transformer r.m.s. Secondary voltage from centre tap to each end of secondary is 50V & load resistance is 980Ω. Find (i) mean load current (ii) RMS value of load current (5)

3. (a) Show the symbol of NPN & PNP type transistors. Draw the circuits of three modes of operation of transistor such as CE, CB and CC. (5)
   (b) Explain the phototransistor & its applications. (5)

4. (a) Define α and β of a transistor. Derive the relation between them. (5)
   (b) In a common base configuration I_c = 0.95 mA & I_B= 0.05 mA. Find the value of α and β. (5)

5. (a) Show a circuit of CE amplifier & explain the function of each components used. (5)
   (b) Explain the input characteristics of transistor CE amplifier. (5)

6. (a) Explain the Working of basic LC tank circuit. (5)
   (b) Sketch the circuit of RC phase shift oscillator and Hartley oscillator. (5)

7. (a) A phase shift oscillator uses 5μF capacitors. Find the values of R to produce a frequency of 500 KHz (5)
   (b) For a Hartley oscillator circuit having L_1 = 1000μH, L_2 =100μH and mutual inductance between the coil M = 20μH, capacitor C=20 pF. Determine the operating frequency of the circuit. (5)

8. (a) What are optoelectronic devices ? Explain LED, LDR & photodiodes. (5)
   (b) Explain 7- segment & 16 - segment display devices with suitable diagrams. (5)

9. Write a note on any two (5×2=10)
   (a) Bridge rectifier circuit
   (b) Venturi tube for measurement of flow
   (c) Calibration, Accuracy & Precision.

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