

**INDIAN MARITIME UNIVERSITY**  
(A CENTRAL UNIVERSITY, GOVERNMENT OF INDIA)  
B.Sc. (NAUTICAL SCIENCE)  
SEMESTER – II – DECEMBER 2014/ JANUARY 2015

**NAUTICAL PHYSICS PAPER IV**

**SUBJECT Code: T- 2206**

TIME: - 3 HRS

MAX. MARKS: - 70

DATE:

Pass Mark - 28

**Note : Answer any SEVEN from the following NINE questions. All questions carries equal marks.**

1. a) What is rectifier? With a neat sketch, explain the working of bridge rectifier. 5  
b) Draw and explain the V-I characteristics of a pn junction. 5
2. a) A full wave rectifier uses two diodes, the internal resistance of each diode may be assumed constant at  $20\ \Omega$ . The transformer r.m.s. secondary voltage from centre tap to each end of secondary is 50 V and load resistance is  $980\ \Omega$ . Find :  
(i) the mean load current      (ii) The r.m.s. value of load current 5  
b) What is zener diode? Explain how zener diode maintains constant voltage across the load. 5
3. a) Draw and explain the input and output characteristics of CE configuration. 5  
b) Define  $\alpha$  and  $\beta$ . Show that  $\beta = \frac{\alpha}{1-\alpha}$ . 5
4. A transistor is connected in CE configuration in which collector supply is 8V and the voltage drop across resistance  $R_c$  connected in the collector circuit is 0.5V. The value of  $R_c = 800\ \Omega$ . If  $\alpha = 0.96$ , determine:  
i. collector-emitter voltage      ii. base current 10
5. Write short note on: 10  
i. LASER diode    ii. Transducer and its application
6. a) In a CB connection,  $\alpha = 0.95$ . The voltage drop across  $2\ \text{K}\ \Omega$  resistance which is connected is 2V. Find the base current. 4  
b) Draw and explain the constructional diagram of cathode ray oscilloscope. 6
7. a) Explain the operation of tank circuit with neat diagrams. 6  
b) In a certain RC oscillator circuit the value of  $R = 220\ \text{k}\ \Omega$  and  $C = 250\ \text{pF}$ . Determine the frequency of oscillations. 4
8. a) Explain the term calibration, accuracy and precision. 5  
b) What are the different methods of measurement of flow. 5

9. a) What are the functions of filter circuit? Explain capacitor filter with a neat circuit diagram and waveforms (4 Marks)

b) The four diodes used in a bridge rectifier circuit have forward resistance which may be considered at  $1\ \Omega$  and infinite reverse resistance. The alternating supply voltage is 240 V r.m.s. and load resistance is  $480\ \Omega$  calculate mean load current and power dissipated in each diode. (6 Marks)

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