

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)
End Semester Examinations-Dec./Jan.2019-20
B.Sc. (Nautical Science)
Semester-II
Nautical Electronics-(UG21T4203)

Date: 6-1-2020
Time: 3 Hrs

Max. Marks: 70
Pass Marks: 35

Part – A is compulsory (5 × 2 = 10 Marks)

1.
 - (a) With respect to a PN junction diode, define the Cut-in Voltage and Peak Inverse Voltage. (2)
 - (b) Differentiate between damped and undamped oscillations. (2)
 - (c) Mention the advantages of negative feedback. (2)
 - (d) What are the uses of a transistor? (2)
 - (e) Compare between an oscillator and an amplifier. (2)

PART-B

Answer any six questions from 2 to 9

2.
 - (a) Describe how a Zener diode acts as voltage regulator with a neat sketch. (5)
 - (b) A half-wave rectifier using silicon diode has a secondary emf of 14.14 V (rms) with a resistance of 0.2Ω . The diode has a forward resistance of 0.05Ω and a threshold voltage of 0.7 V. If load resistance is 10Ω , determine,
 - i. Dc load current
 - ii. Dc load voltage
 - iii. Voltage regulation
 - iv. Efficiency (5)
3.
 - (a) Define α and β current gains for a transistor. Give relationship between them. (5)
 - (b) The reverse saturation current of an NPN transistor in common-base circuit is $12.5\mu\text{A}$. For an emitter current of 2 mA, collector current is 1.97 mA. Determine the current gain and base current. (5)

- 4.
- (a) Explain the need for biasing a transistor with neat circuit diagram. (5)
 - (b) A tuned collector oscillator has a fixed inductance of $150\mu\text{H}$ and has to be tunable over the frequency band of 700 kHz to 2100 kHz. Find the range of variable capacitor to be used. (5)
5. (a) Prove the following Boolean identity:
 $(A+B)(A+C)=A+BC$ (5)
- (b) Draw the logic circuit diagram of full-adder, with necessary equations and tables. (5)
- 6.
- (a) What is Modulation Index? What are various methods for the measurement of Modulation Index? (5)
 - (b) A sinusoidal carrier voltage frequency 1500 kHz is amplitude modulated by a sinusoidal voltage frequency 25 kHz, resulting in maximum and minimum modulated carrier amplitudes of 150 V and 75 V respectively. Calculate,
 - i. Frequency of lower and upper side bands.
 - ii. Modulation index.
 - iii. Amplitude of each side band. (5)
- 7.
- (a) Draw block diagram of FM Radio broadcast Transmitter and explain its working in brief? (5)
 - (b) Compare Amplitude Modulation and Frequency Modulation. (5)
8. (a) Explain advantages and disadvantages of RADAR. (5)
- (b) Explain in detail the domestic satellite. (5)
9. Write Notes on any Two.
- (a) Super heterodyne Receiver (5)
 - (b) LDR (5)
 - (c) Seven segment display (5)
 - (d) Radio Direction Finder. (5)
