INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)
END SEMESTER EXAMINATION DEC./JAN-2019-20
B.SC. (Nautical Science)
Semester: II
Nautical Electronics (UG21T3203)

Date:06-01-2020 Maximum marks:70
Time: 3 Hours Pass marks:35

PART-A:Compulsory question

1.a) Define PN junction diode. (2)

b) Define current gain α and β of transistor. (2)

c) State Barkhausen's criteria for oscillations. (2)

d) What is the need for modulation. (2)

e) What are the elements of RADAR system. (2)

PART-B

(Attempt any six questions out of eight)

2.a) What is rectifier? With a neat sketch, explain the working of a half wave rectifier. (5)

b) Determine the output voltage for inverting and non-inverting amplifier circuit having R_{in}=2.4 KΩ,R_f =240KΩ and input voltage 120μV.Show the circuits as well. (5)

3.a) What is a transistor? Explain input and output characteristics of a NPN transistor in a common base configuration. (5)

b) Classify the amplifiers according to the mode of operations. (5)

4. a) What is an oscillator? Compare it with an amplifier. (5)

b) A tuned collector oscillator has a fixed inductance of 100μH and has to be tunable over the frequency band of 500 kHz to 1500 kHz. Find the range of variable capacitor to be used. (5)

5.a)Prove the Boolean Identities. (5)

a) (A*B)*(A + B) = 0

b) (A*B) + (A + B) =1

b) What are flip flop circuits? Explain basic flip flop circuit using transistor.(5)

6. a) What is frequency modulation? How it is different from amplitude modulation? (5)

b) A sinusoidal carrier voltage frequency 1000 kHz is amplitude modulated by a sinusoidal voltage frequency 20 kHz, resulting in maximum and minimum modulated carrier amplitudes of 100 V and 50 V respectively. Calculate,

i. Frequency of lower and upper side bands.
ii. Modulation index.
iii. Amplitude of each side band. (5)

7.a) Define Modulation Index and detection efficiency. (5)

b) Show the circuit of Hartley oscillator and determine the operating frequency and feed back fraction if L_1=1000μH, L_2=100μH and C=20PF. (5)

8. a) Draw and explain diagram of Radio Broadcast Transmitter for AM Radio Broadcasting? (5)

b) Draw and explain block diagram of FM Radio Receiver? (5)

9. a) Draw block schematic and explain basic concepts of RADAR. (5)

b) Write short note on Radio Direction Finder. (5)

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