BT MRE-II(R/S)-04-24-3236 Reg. No. | | | | | | | | |

C

B.Tech. Degree II Semester Regular/Supplementary Examination in Marine Engineering June 2024

19-208-0204 BASIC ELECTRONICS AND MEASUREMENTS

(2019 Scheme)

Time: 3 Hours Maximum Marks: 60

Course Outcome
On successful completion of the course, the students will be able to:

CO1: Characterise semiconductors, diodes and transistors.
CO2: Explain the construction, characteristics and working of various semiconductor devices.
CO3: Understand the working of oscillators and other waveshaping and switching circuits.
CO4: Use different meters and balance bridge to find unknown values.
CO5: Use digital voltmeters, CRO, multimeters.
Bloom's Taxonomy Levels (BL): L1 – Remember, L2 – Understand, L3 – Apply, L4 –Analyze, L5 – Evaluate, L6 – Create
PI – Programme Indicators

Answer *ALL* questions (5 × 15 = 75)

			Marks	BL	CO	PI
I.	(a)	Differentiate between Zener breakdown and Avalanche breakdown.	3	L2	1	1
	(b)	Compare between half-wave and full-wave rectifiers.	4	L2	2	1
	(c)	Derive the expression for the ripple factor of a full-wave bridge rectifier. Design a full wave rectifier with a capacitor input filter to obtain 4% ripple factor.	8	L3	2	1
		OR				
II.	(a)	How are drift and diffusion currents formed across a p-n junction? Explain.	3	L1	1	1
	(b)	Compare CE, CB and CC transistor configurations.	4	L2	1	1
	(c)	Discuss the various transistor biasing circuits and comment on their stability.	8	L1	2	1
III.	(a)	Draw the output characteristics of an FET and mark the various regions of operation. In which region does the FET works as a voltage controlled resistor?	7	L1	2	1
	(b)	Explain the working of an RC coupled amplifier with a neat circuit diagram. Discuss the effects of coupling and de-coupling capacitors on the frequency response.	8	L2	2	1
		OR				
IV.	(a)	Explain the working of transistor as a switch.	7	L2	2	1
	(b)	Discuss the characteristics of a Zener diode and its usage as voltage regulator. Design a simple shunt regulator for an output voltage of 10 V when the input varies between 12 V and 18 V and the maximum load current is 50 mA.	8	L3	1	1

(P.T.O.)

			Marks	BL	CO	PI
V.	(a)	What is Barkhausen criteria? Explain anyone oscillator using inductive feedback.	9	L1	3	1
	(b)	Design a trapezoidal clipper to clip both positive and negative half cycle at 5 V for an input voltage of 10V. Also draw its transfer characteristics.	6	L3	3	1
		OR				
VI.	(a)	Explain how an RC integrator acts as a low pass filter with necessary waveforms.	7	L2	3	1
	(b)	Explain the working of an astable multivibrator with necessary waveforms. How can rounding off collector waveform be avoided?	8	L2	3	1
VII.	(a)	What are the essential requirements of a measuring instrument? What are the errors that occur in most type of instruments?	5	L1	4	1
	(b)	Explain the construction, working principle and torque equation of dynamometer type instrument. What are its advantages and disadvantages?	10	L2	4	1
		OR				
VIII.	(a)	Explain the working principle of a thermoelectric instrument and thermocouple type of ammeter and voltmeter used to measure current and voltages.	8	L2	4	1
	(b)	Explain the measurement of resistance by bridge method.	7	L2	4	1
IX.	(a)	Discuss the working principle of a CRO with neat sketches. How the frequency and phase measurement is done using a CRO?	8	L1	5	1
	(b)	Explain the construction and working of multimeter.	7	L2	5	1
		OR				
X.	(a)	Explain the working principle behind the measurement of luminous intensity.	7	L2	5	1
	(b)	Explain the measurement of temperature using transducers.	8	L2	5	1

Bloom's Taxonomy Levels
L1 = 27%, L2 = 59%, L3 = 14%.

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