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(Revision-2021)

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**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, APRIL - 2022**

BASIC ELECTRONICS

[Maximum marks: 75]

(Time: 3 Hours)

PART A

I. Answer all the following questions in one word or one sentence. Each question carries 1 mark

(9 x 1 = 9 Marks)

		Module outcome	Cognitive level
1	Define doping	M1.01	R
2	What is the value of knee voltage of a silicon diode?	M1.03	R
3	Draw the symbol of an NPN transistor and mark the terminals.	M2.01	R
4	Define the current amplification factor β of a transistor.	M2.03	R
5	Which mode of operation of a transistor makes it equivalent to an open switch?	M2.04	R
6	Draw the symbol of UJT and mark the terminals.	M3.01	R
7	Why JFET is considered as a voltage controlled device?	M3.02	R
8	What is the function of filter circuits in a rectifier?	M4.02	R
9	Relate the time constant RC of the circuit and the time period of the input wave for a good differentiation.	M4.03	R

PART B

II. Answer any eight questions from the following. Each question carries 3 marks

(8 x 3 = 24 Marks)

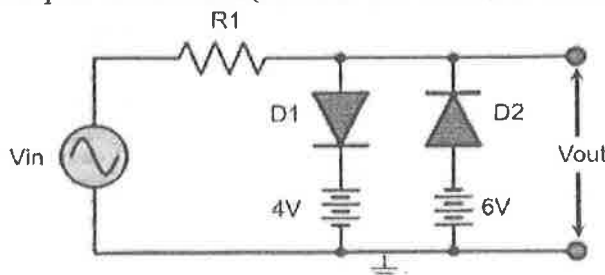
		Module outcome	Cognitive level
1	Explain the formation of P type semiconductor from an intrinsic semiconductor with diagram.	M1.01	U
2	List the difference between drift and diffusion currents	M1.02	R
3	With diagram, explain the formation of barrier potential in a PN junction	M1.02	U
4	Draw the forward VI characteristics and the corresponding junction biasing of a PN junction diode.	M1.03	U
5	Explain active, saturation and cut off modes of operation of a transistor w.r.t. biasing	M2.04	U
6	Outline the CB, CE and CC configurations of NPN transistor.	M2.03	U
7	Outline the output characteristics of CE configuration of NPN transistor and mark active, saturation and cut off regions.	M2.04	U
8	Explain transistor action as an amplifier with a diagram	M2.05	U
9	Draw the equivalent circuit of UJT and define intrinsic stand-off ratio.	M3.03	R
10	Outline an RC circuit to obtain a triangular waveform from a square wave input. Relate output wave with input wave diagrammatically	M4.03	U

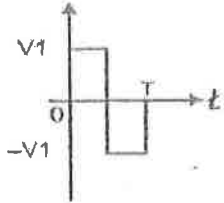
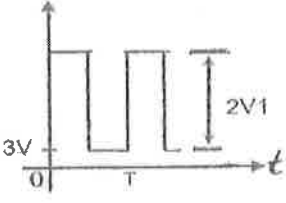
PART C

III. Answer all questions. Each question carries seven marks

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
1.	Demonstrate how static and dynamic resistance of PN junction diode can be calculated from VI characteristics.	M1.03	U
	OR		
2.	Explain the energy band diagrams of a conductor, semiconductor and insulator and with a diagrams.	M1.01	U
3.	Outline the physical structure of an NPN transistor and explain the working principle.	M2.02	U
	OR		
4.	Explain the terms α and β of a transistor. Derive the relation between α and β	M2.03	U
5.	Illustrate the structure of N channel JFET and explain the working principle.	M3.02	U
	OR		
6.	Outline the drain characteristics of N channel depletion type MOSFET and explain the operating modes.	M3.03	U
7.	Compare the features of BJT with FET.	M3.04	U
	OR		
8.	Explain the negative resistance property exhibited by UJT in its V-I characteristics.	M3.03	U
9.	Illustrate the operation of a shunt capacitor filter with diagram and waveform	M4.02	U
	OR		
10.	Demonstrate the operation of a voltage tripler with a circuit diagram	M4.05	U
11.	Model the output waveform for the given circuit if the input V_{in} is a 20Vpp sine wave. Explain the working of the circuit and outline the input and output waveforms. (Assume that the diode is ideal)	M4.04	A



12	<p style="text-align: center;">OR</p> <p>Construct a diode circuit to realise the given output waveform from the given input. Explain the working of the circuit. (Assume that the diode is ideal)</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>INPUT</p>  </div> <div style="text-align: center;"> <p>OUTPUT</p>  </div> </div>	M4.04	A
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