Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18EC2032** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ELECTRON DEVICES AND CIRCUITS** | **Max. Marks :** | **100** |

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| **Q. No.** | **Questions** | **Course Outcome** | **Marks** |
| **PART – A (10X1 = 10 MARKS)** | | | |
| 1. | Define diffusion current. | CO1 | 1 |
| 2. | Name the diode that maintains a constant dc output voltage irrespective of the fluctuations in ac input voltage or load current. | CO1 | 1 |
| 3. | Calculate the peak voltage of a HWR circuit if its RMS value is 5V. | CO2 | 1 |
| 4. | Draw the symbol of Varactor diode. | CO2 | 1 |
| 5. | TRIAC behaves as unidirectional switch. True / False. | CO4 | 1 |
| 6. | Name the diode that is widely used for high frequency switching applications. | CO3 | 1 |
| 7. | What is the efficiency of full wave rectifier? | CO4 | 1 |
| 8. | Name the type of power amplifier that has good efficiency but poor signal quality. | CO3 | 1 |
| 9. | List the diodes that exhibit negative resistance effect. | CO5 | 1 |
| 10. | What will be the phase shift oscillator if the circuit has three RC network? | CO6 | 1 |

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| **PART – B (6 X 3 = 18 MARKS)** | | | |
| 11. | If the drift velocity of holes under a field gradient of 200v/m is 10m/sec. Find its mobility. | CO1 | 3 |
| 12. | When a reverse current of a Zener diode ranges from 10mA to 15mA and Zener voltages range from 6V to 7.2V. Calculate the impedance of the device. | CO2 | 3 |
| 13. | Draw the output characteristics graph of CE configuration of a BJT and Justify the statement that BJT is a current control device. | CO3 | 3 |
| 14. | Draw the schematic of a Zener shunt regulator. | CO4 | 3 |
| 15. | The circuit is to be a 2-stage RC oscillator which will therefore consist of equal resistors and three equal 1pF capacitors. As the frequency of oscillation is given as 6.5kHz, calculate the value of the resistors. | CO6 | 3 |
| 16. | List the characteristics of an Oscillator. | CO6 | 3 |

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| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.no 17 to 23. Q.No 24 is a Compulsory Question)** | | | | |
| 17. | a. | Elaborate on the different methods of electron hole generation and recombination. | CO1 | 8 |
| b. | Compare Instrinsic and Extrinsic semiconductors. | CO1 | 4 |
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| 18. | a. | With neat diagram, explain the construction and working of PN junction and Zener diode. | CO1 | 8 |
| b. | A bipolar NPN transistor has a DC current gain value , β =100. Calculate the base current Ib required to switch a resistive load of 2mA. Also calculate current gain α. | CO1 | 4 |
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| 19. | a. | Describe in detail about Silicon Controlled Rectifier. | CO5 | 6 |
| b. | Elaborate on the construction, working and application of a diode which is known as Esaki diode. | CO6 | 6 |
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| 20. | a. | Derive the efficiency and ripple factor of a half wave rectifier circuit. | CO2 | 8 |
| b. | An a.c. supply of 230 V is applied to a half-wave rectifier circuit through a transformer of turn ratio 10 : 1. Find:   1. the output d.c. voltage and 2. the peak inverse voltage. Assume the diode to be ideal. | CO4 | 4 |
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| 21. | a. | With a neat diagram explain a power supply and justify the need of voltage regulators in it. | CO2 | 8 |
| b. | A full-wave rectifier uses two diodes, the internal resistance of each diode maybe assumed constant at 10 Ω. The transformer r.m.s. secondary voltage from centre tap to each end of secondary is 50 V and load resistance is 980 Ω. Find : (i) the mean load current (ii) the r.m.s. value of load current. | CO5 | 4 |
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| 22. | a. | Compare series and shunt voltage regulators with neat diagram. | CO5 | 6 |
| b. | Discuss how a transistor is used as a series voltage regulator. | CO3 | 6 |
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| 23. | a. | Elaborate on any two classes of power amplifiers. | CO3 | 8 |
| b. | Comment on the need of differential amplifiers. | CO4 | 4 |
|  | **Compulsory:** | |  |  |
| 24. | a. | Explain in detail the construction and working of a RC phase shift oscillator and derive the expression for calulating the frequency of oscillation. | CO6 | 12 |