**20EC303**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **March, 2022** | **Electronics and Communication Engineering** | | |
| **Third Semester** | **ELECTRONIC DEVICES AND CIRCUITS** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No.1 compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14=56 Marks) |

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| 1. | a) | | What is space charge capacitance | CO1 |  |
|  | b) | | Define dynamic resistance of a diode | CO1 |  |
|  | c) | | List the applications of LED | CO1 |  |
|  | d) | | What is the effect of temperature on PN characteristics | CO2 |  |
|  | e) | | Draw the circuit of a full wave rectifier | CO2 |  |
|  | f) | | In common base connection IC=0.96mA and IB=0.05mA. what is the value of α | CO2 |  |
|  | g) | | Define the term β of a transistor | CO3 |  |
|  | h) | | Why is the base region of a transistor made thin | CO3 |  |
|  | i) | | What is bias compensation | CO3 |  |
|  | j) | | Define pinch-off voltage | CO3 |  |
|  | k) | | List the advantages of FET over BJT | CO4 |  |
|  | l) | | Draw the circuit symbol for a TRIAC | CO4 |  |
|  | m) | | Define the term drain resistance | CO4 |  |
|  | n) | | Draw the circuit symbol for MOSFET | CO4 |  |
| **Unit - I** | | | | | |
| 2. | a) | Explain the effect of temperature on reverse saturation current (Ico) by deriving the necessary equation. | | CO1 | 7M |
|  | b) | Derive and explain the transition capacitance of PN-diode. | | CO1 | 7M |
| **(OR)** | | | | | |
| 3. | a) | Explain about zener breakdown and avalanche multiplication | | CO1 | 7M |
|  | b) | Draw the volt-ampere characteristics of tunnel diode. Explain the characteristics on the basis of tunneling theory? | | CO1 | 7M |
| **Unit - II** | | | | | |
| 4. | a) | The primary to secondary turns ratio of a transformer used in a HWR is 20:1. If the primary is connected to the power mains: 220V, 50Hz, calculate D.C voltage across the 1KΩ load resistor. Also find the diode current. | | CO2 | 7M |
|  | b) | Derive expressions for ripple factor (r), rectification efficiency (η ) of FWR | | CO2 | 7M |
| **(OR)** | | | | | |
| 5. | a) | Draw the circuit of Series inductor filter & Explain its operation | | CO2 | 7M |
|  | b) | Draw the circuit of LC filter and explain its operation? mention expression for the ripple factor | | CO2 | 7M |
| **Unit - III** | | | | | |
| 6. | a) | A transistor has IB = 105µA and IC = 2.05mA. Find i) β of transistor. ii) α of  Transistor iii) emitter current IE  iv)Now, if IB changes by 27µA and IC changes by +0.65mA,   Find the new value of β. | | CO3 | 7M |
|  | b) | Draw and explain Emitter bias. And derive stability factor formula for emitter bias? | | CO3 | 7M |
| **(OR)** | | | | | |
| 7. | a) | Explain the input and output characteristics of CB configuration | | CO3 | 7M |
|  | b) | Write short notes on Thermal stability | | CO3 | 7M |
| **Unit - IV** | | | | | |
| 8. | a) | Draw and explain VI characteristics of UJT and SCR. | | CO4 | 7M |
|  | b) | Explain the working of N-Channel JFET. Draw its equivalent circuit? | | CO4 | 7M |
| **(OR)** | | | | | |
| 9. | a) | Explain the construction and working of a TRIAC. Sketch its V-I characteristics? | | CO4 | 7M |
|  | b) | Explain the operation of an N-channel enhancement type MOSFET with the help of its (ID-VDS) and (ID-Vas) characteristics. | | CO4 | 7M |

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