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| Image result for adamas university logo | **ADAMAS UNIVERSITY**  **END SEMESTER EXAMINATION**  (Academic Session: 2020 – 21) | | |
| **Name of the Program:** | B. Tech | **Semester:** | I |
| **Paper Title:** | Electrical & Electronics Technology | **Paper Code:** | EEE41102 |
| **Maximum Marks:** | 50 | **Time Duration:** | 3 Hrs |
| **Total No. of Questions:** | 17 | **Total No of Pages:** | 04 |
| *(Any other information for the student may be mentioned here)* | 1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. 2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. 3. Assumptions made if any, should be stated clearly at the beginning of your answer. | | |

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| **Group A**  **Answer All the Questions (5 x 1 = 5)** | | | |
| **1** | What is meant by pinch-off voltage? | **R** | **CO2** |
| **2** | Convert numbers: **i)** (53.625)10 = (?)2, **ii)** (A3B)16 = (?)10 | **AP** | **CO9** |
| **3** | For a base current of 10 μA, what is the value of collector current in common emitter? (βdc = 100)  **a)** 100 μA **b)** 10 μA  **c)** 10 mA **d)** 1 mA | **R** | **CO2** |
| **4** | “Current is not a vector”-Justify. | **AN** | **CO1** |
| **5** | What is susceptance? | **U** | **CO1** |
| **Group B**  **Answer All the Questions (5 x 2 = 10)** | | | |
| **6 a)** | **i)** Why FET is called as “voltage-controlled device”?  **ii)** Solve the Boolean expression | **R. AP** | **CO8, CO9** |
| **(OR)** | | | |
| **6 b)** | **i)** Define the current gain α and β.  **ii)** Find the relationship between α and β. | **R** | **CO2** |
| **7 a)** | Compare between Metal, Semiconductor & Insulator with the help of Energy Band Diagram. | **U** | **CO1** |
| **(OR)** | | | |
| **7 b)** | Determine the current where a resistance of 1 KΩ is in series with the diode and a forward potential of 10V is applied to a Si diode. | **E** | **CO8** |
| **8 a)** | Determine the current in a p-n junction, considering it at T=300 K, in which IS=10-14 Aandn = 1. Find the diode current for VD = 0.7 v and VD = - 0.7 v | **E** | **CO8** |
| **(OR)** | | | |
| **8 b)** | “Average Power is more convenient to measure than Instantaneous Power”- Justify | **AN** | **CO6** |
| **9 a)** | Explain with the help of a diagram how alternating current is generated. | **U** | **CO6** |
| **(OR)** | | | |
| **9 b)** | Derive the expression of resonant frequency of a series R-L-C circuit. | **U** | **CO6** |
| **10 a)** | Why series resonant circuit is called ‘Acceptor Circuit’? | **AN** | **CO6** |
| **(OR)** | | | |
| **10 b)** | Find the node voltages V1 and V2 in the circuit | **AP** | **CO3** |
| **Group C**  **Answer All the Questions (7 x 5 = 35)** | | | |
| **11 a)** | **i)** Determine the minimum base current (IB) required to drive the transistor to saturation (in the figure below). Assuming VCEsat = 0.2 V and β = 50    **ii)** Explain Drift of Carriers. | **E, U** | **CO3** |
| **(OR)** | | | |
| **11 b)** | **i)** Find the expression of Transconductance, drain resistance of JFET.  **ii)** Compare between BJT & FET. | **R, U** | **CO8** |
| **12 a)** | **i)** Explain the procedure to measure the time period of a sinusoidal signal using CRO.  **ii)** As VGS is changed from -1 V to -2 V keeping VDS constant, ID of a FET drops from 7 to 5 mA. What is the transconductance of the FET? If the ac drain resistance is 250 kΩ. | **U, R** | **CO4, CO8** |
| **(OR)** | | | |
| **12 b)** | **i)** Design and implement EX-OR gate using NAND gate.  **ii)** Determine the hole concentration of a silicon crystal having donor concentration of 2.4\*1024 /m3, when intrinsic carrier concentration is 1.6\*1018 /m3? Find the ratio of electron and hole concentration. | **CR, E** | **CO9, CO8** |
| **13 a)** | **i)** What is Fermi level? Show that the Fermi level is at the centre of forbidden gap in an intrinsic semiconductor.  **ii)** Why transistor is called current controlled device? | **R** | **CO1, CO2** |
| **(OR)** | | | |
| **13 b)** | **i)** Explain the common emitter transistor circuit and output characteristics.  **ii)** What are the effecting parameters that responsible to change the Q points? | **U, R** | **CO8** |
| **14 a)** | **i)** Explain the phenomenon of diffusion of current carriers in a semiconductor.  **ii)** Write Einstein’s relation between mobility & diffusivity. | **U** | **CO1** |
| **(OR)** | | | |
| **14 b)** | **i)** A resistance and an inductance are connected in series across a voltage V = 200 sin 314t. The current flowing through the circuit is 5 sin (314t- π/4). Find the values of resistance, inductance and power factor.  **ii)** Find the current through 10 ohm | **AP** | **CO3** |
| 1. **a)** | **i)** Define rms and average value of an alternating quantity. Explain how these values can be obtained for a steady state sinusoid?  **ii)** What should be the value of R such that maximum power transfer can take rest of the network to R in figure? Obtain the amount of this power. | **U,AP** | **CO6,CO5** |
| **(OR)** | | | |
| **15 b)** | **i)** Find the Thevenin equivalent circuit of the circuit shown in figure, to the left of the terminals a-b. then find the current through RL= 6, 16 and 36 ohm    **ii)** Prove that the energy stored in the capacitor is, W = C (where, C is the capacitance and V is the applied voltage. | **AP,U** | **CO5** |
| **16 a)** | **i)** Find the Norton’s equivalent circuit of the circuit in figure at terminals a-b    **ii)** Find the value of RL for maximum power transfer in the circuit of figure. Find the maximum power. | **AP** | **CO5** |
| **(OR)** | | | |
| **16 b)** | **i)**Show that active power consumed in a purely inductive circuit and purely capacitive circuit is zero when sinusoidal voltage is applied across it.  **ii)** What do you mean by active power and reactive power? | **U** | **CO6** |
| **17 a)** | **i)**Why sinusoidal wave shape is recommended for voltage and current during generation, transmission and utilisation of power?  **ii)** Explain that in series RLC circuit the voltage across L and C at resonance may exceed even the supply voltage. | **An** | **CO6** |
| **(OR)** | | | |
| **17 b)** | **i)** Draw the phasor diagram of the following  1.Series RL circuit. 2.Parallel RL circuit. 3.SeriesRLC circuit. 4.Parallel RLC circuit.  **ii)** State and explain Maximum power transfer theorem in ac circuits. | **U** | **CO6** |