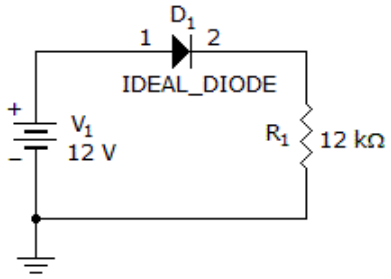
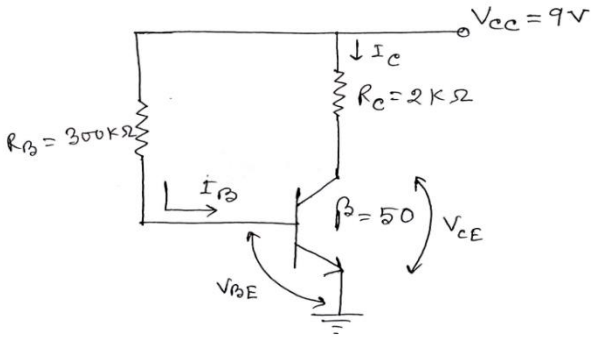
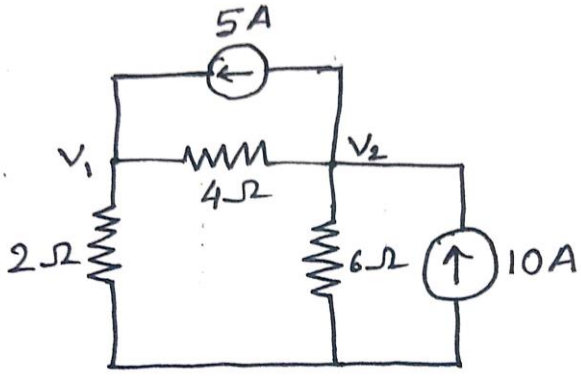
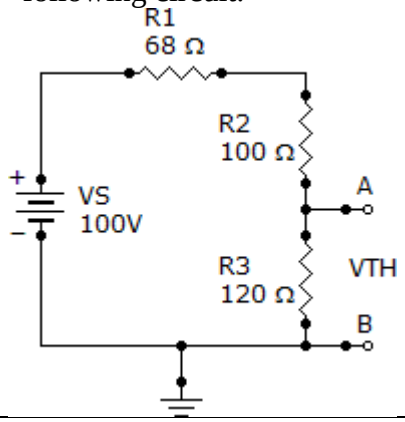
	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B. TECH	**Semester:**	II
Paper Title:	Electrical & Electronics Technology	**Paper Code:**	GEE11001
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	03
(Any other 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.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	**What** is the current through the diode?  **a)** 1 mA **b)** 0.975 mA **c)** 0.942 mA **d)** 0.5 mA	**R**	**CO4**
2	The active region of a BJT the emitter junction is in .....bias and collector junction is in .....bias. **a)** Forward, Reverse **b)** Forward, Forward **c)** Reverse, Forward **d)** Reverse, Reverse	**R**	**CO5**
3	**Find** the decimal equivalent of hex number 1A53. **a)** 6793 **b)** 6739 **c)** 6973 **d)** 6379	**R**	**CO6**
4	Power factor of electric bulb is **a)** Unity **b)** Lagging **c)** Leading **d)** Zero	**R**	**CO3**
5	The active power drawn by a capacitor **a)** 0 **b)** 1 **c)** 0.5 **d)** 2	**R**	**CO1**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	**Why** does a pure semiconductor behave like an insulator at absolute zero temperature?	**R**	**CO4**
(OR)			
6 b)	**Define** the following: **a)** Power factor, **b)** Quality factor.	**R**	**CO3**

7 a)	In a BJT, the emitter current (I_E) is 12 mA. If I_E is 1.02 times of the collector current, then **find** the base current.	**R**	**CO5**
	(OR)		
7 b)	Transform the sinusoid to phasor: V= -4 sin (30t -400).	**A**	**CO3**
8 a)	**Compare** between BJT & FET.	**U**	**CO5**
	(OR)		
8 b)	Define the following: i) Active Power. ii) Reactive Power.	**U**	**CO2**
9 a)	Convert numbers: **i)** $(53.625)_{10} = (?)_2$, **ii)** $(A3B)_{16} = (?)_{10}$	**R**	**CO6**
	(OR)		
9 b)	Draw the phasor diagram of R-L-C series circuit when XL>XC	**E**	**CO2**
10 a)	**Determine** the collector current (I_C) and V_{CE} for the given circuit as shown in figure. (Consider V_{BE}=0.7V for a Silicon Transistor) 	**E**	**CO5**
	(OR)		
10 b)	A single 50 Hz motor takes 100 A at 0.85 p.f lagging from a 240 V supply. Calculate the (i) active and reactive components of the current and (ii) the power taken from the supply.	**E**	**CO2**
	Group C **Answer All the Questions (7 x 5 = 35)**		
11 a)	**i) Explain** the phenomenon of diffusion of current carriers in a semiconductor. **ii)** Write Einstein's relation between mobility & diffusivity.	**U**	**CO4**
	(OR)		
11 b)	Find the node voltages V1 and V2 in the circuit 	**A**	**CO1**
12 a)	**Analyze** the current components of PNP in Bipolar Junction Transistor.	**AN**	**CO5**
	(OR)		

12 b)	**Find** the Thevenin's equivalent circuit for the following circuit.  	**AN**	**CO1**
13 a)	**i) Design** and implement EX-OR gate using NAND gate. **ii) Determine** the hole concentration of a silicon crystal having donor concentration of $2.4*10^{24}$ /m^3, when intrinsic carrier concentration is $1.6*10^{18}$ /m^3? Find the ratio of electron and hole concentration.	**C, E**	**CO6 & CO4**
	(OR)		
13 b)	A certain current source has the values I= 4 µA and R = 1.2 MΩ. Determine the values for an equivalent voltage source.	**An**	**CO1**
14 a)	**i) What** is Fermi level? **Show** that the Fermi level is at the centre of forbidden gap in an intrinsic semiconductor. **ii) Determine** the current in a p-n junction, considering it at T=300 K, in which $I_S=10^{-14}$ A and n = 1. Find the diode current for V_D = 0.7 v and V_D = - 0.7 v	**E**	**CO4**
	(OR)		
14 b)	What is resonance? Derive expression of resonance frequency for series R-L-C circuit.	**U**	**CO2**
15 a)	**i)** Draw schematically the structure of n channel JFET and explain the operation briefly. **ii) Why** Silicon type transistors are more often used than Germanium type?	**U, R**	**CO5, CO4**
	(OR)		
15 b)	Prove that the energy stored in the inductor is, W = 1/2 L i^2 (where, 'L' is the capacitance and 'i' is the current through inductor)	**E**	**CO2**
16 a)	**i)** How you measure resistance value using colour code and power rating of a resistor? **ii)** Briefly explain the three regions that are present in the drain characteristics of JFET?	**R, U**	**CO6**
	(OR)		
16 b)	Write a short note on maximum power transfer theorem.	**R**	**CO1**
17 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**	**CO5**
	(OR)		
17 b)	Draw the phasor diagram of the following circuits. (i) Series RL circuit and (ii) Parallel RLC circuit	**U**	**CO3**