18ELN14/24

Visvesvaraya Technological University, Belagavi

MODEL QUESTION PAPER

1^{st} / 2^{nd} Semester, B.E (CBCS)

Course: 18ELN14/24- Basic Electronics – *Set no. 3*

Note: (i) Answer five full questions selecting any one full question from each module.
(ii) Missing data may be suitably assumed

Time: 3 Hrs **Max. Marks: 100**

		MODULE 1	
1	a	Explain the forward and reverse bias condition for a pn junction diode with neat diagram.	08M
	b	A half wave rectifier is fed from a supply of 230 V, 50 Hz with step down transformer of ratio 3:1. Resistive load connected is 10 KΩ. The diode forward resistance is 75Ω and transformer secondary is 10 Ω. Calculate the DC load current, DC load voltage, efficiency and ripple factor.	06M
	c	Write a short note on the following: (i) Photo diode (ii) Light emitting diode	06M
		OR	
2	a	With neat circuit diagram and wave forms explain the working of a centre tapped full wave rectifier.	08M
	b	A Zener diode has a breakdown voltage of 10V. It is supplied from a voltage source varying between 20-40V in series with a resistance of 820Ω. Using an ideal Zener model, obtain the minimum and maximum Zener currents	06M
	c	Explain the features of LM7805 fixed regulator.	06M
		MODULE 2	
3	a	Explain the construction and operation of a p-channel JFET	08M
	b	With neat diagram explain the operation of a CMOS inverter.	06M
	c	With neat diagram explain the VI characteristics of an SCR.	06M
		OR	
4	a	Explain the characteristics of an n-channel JEFT.	06M
	b	With neat diagram, explain the characteristics of a enhancement type MOSFET.	08M
	c	With neat diagram explain the two transistor model of an SCR.	06M

		MODULE 3	
5	a	Explain the following with respect to op-amp (i) Input Impedance (ii) output impedance (iii) Slew rate (iv) CMRR (v) virtual ground	10M
	b	Derive an expression for the output voltage of an inverting amplifier.	06M
	c	The input to the basic differentiator circuit is a sinusoidal voltage of peak value of 10mV and frequency 1.5KHz. Find the output if, Rf=100KΩ and C1=1µF.	04M
		OR	
6	a	Derive an expression for the output voltage of an op-amp integrator.	06M
	b	Derive an expression for the output voltage of an inverting summer.	06M
	c	A non-inverting amplifier circuit has an input resistance of 10KΩ and feedback resistance 60KΩ with load resistance of 47KΩ. Draw the circuit. Calculate the output voltage, voltage gain, load current when the input voltage is 1.5V.	08M
		MODULE 4	
7	a	Explain how the transistor can be used as a switch and as an amplifier.	10M
	b	An amplifier has a high frequency response described by $A=\frac{A0}{1+(j\omega/\omega 2)}$. Where in A_0=1000, ω_2=104 rad/s. Find the feedback factor which will raise the upper corner frequency ω_2 to 105 Hz. What is the corresponding gain of the amplifier? Find also the gain bandwidth product in this case.	04M
	c	With a neat circuit diagram, explain the working of RC phase shift oscillator.	06M
		OR	
8	a	List the advantages of negative feedback in an amplifier. Explain the voltage series feedback amplifier. Show that the gain band width product for a feedback amplifier is constant.	10M
	b	The frequency sensitivity arms of the Wein bridge oscillator uses $C_1=C_2$=0.01µF and R_1=10KΩ while R_2 is kept variable. The frequency is to be varied from 10KHz to 50 KHz by varying R_2. Find the minimum and maximum values of R_2.	04M
	c	With a neat diagram explain the Astable operation of IC 555 timer.	06M
		MODULE 5	
9	a	Simplify the following Boolean expressions (i) $Y=A\acute{B}+AB$ (ii) $Y=AB+AC+BD+CD$ (iii) $Y=(B+CA)(C+\acute{A}B)$ (iv) $Y=\acute{A}\acute{B}\acute{C}\acute{D}+\acute{A}\acute{B}\acute{C}D+A\acute{B}\acute{C}\acute{D}+A\acute{B}\acute{C}D$	08M
	b	With a neat circuit diagram and truth table, explain the working of a JK flip flop.	06M

	c	With a neat diagram, explain the working of a communication system.	06M
		OR	
10	a	Simplify and realize the following using NAND gates only *(i)* $Y = AC + ABC + \acute{A}BC + AB + D$ *(ii)* $Y = A\acute{B}\acute{C} + \acute{A}\acute{B}\acute{C} + \acute{A}\acute{B} + \acute{A}\acute{C}$	08M
	b	With a neat circuit diagram and truth table, explain the full adder circuit.	06M
	c	With a neat block diagram, explain the operating principle of the GSM system.	06M