Bachelor of Science (S.Y.B.Sc.) Fourth Semester B.Sc. 24122 - Physics Paper-II (Atomic Physics and Solid State Electronics)

P. Pages : 2 Time : Three Hours			lours * 1 0 1 4 * Max. Marks	GUG/W/18/1301 Max. Marks : 50	
	Note	es :	 All questions are compulsory. Draw neat labelled diagram wherever necessary. 		
1.	Eith	er:-			
	a)	1)	Discuss the fundamental concepts on which the vector atom model is built.	4	
		ii)	Name the four quantum numbers of an electron and explain their significance.	4	
		iii)	Discuss the result of stern-Gerlach experiment.	2	
	h)	i)	OR Explain input and output characteristics of transistor in CE mode	5	
	0)		Define word 0 of a transister and abtain relation between them	2	
		11)	Define α and β of a transistor and obtain relation between them.	3	
		iii)	A transistor with an $\alpha = 0.99$ is operated in a CE configuration. What is the value of β .	2	
2.	Either:-				
	a)	i)	What do you mean by the term MOSFET? Is it current or voltage operated device?	2	
		ii)	With the help of suitable diagram, explain the construction and working of enhancement MOSFET.	6	
		iii)	Calculate the dynamic resistance of a JFET with amplification factor 80 and transconductance 200 μ mho.	2	
	b)	i)	OR Describe difference amplifier	3	
	0)	1)		5	
		ii)	Explain the construction of operational amplifier using difference amplifier.	3	
		iii)	Explain how Op Amp can be used as adder.	4	
3.	Eith	er:-			
	a)	Exp	lain Pauli's principle.	21/2	
	b)	Des	cribe self bias stabilizing circuit.	21/2	
	c)	Stat	e the advantages of FET over BJT.	2 ¹ /2	
	d)	Exp	lain tuned circuit and its frequency.	21/2	
	e)	Dis	OR tinguish between normal and anomalous Zeeman effect.	2¹/ ₂	

	f)	Explain graphical analysis of CE configuration.	21/2			
	g)	Calculate the voltage gain of a common source JFET amplifier having transconductance 2500 μ mho and load resistance of 5k Ω .	21/2			
	h)	Describe use of Op Amp as an inverting amplifier.	21/2			
4.	Either:-					
	a)	Write a note on "Selection Rules".	21/2			
	b)	Explain why stabilizing circuits are necessary for CE amplifier only and not for CB amplifier.	21/2			
	c)	Define the terms (a) Drain resistance (b) Transconductance (c) Amplification factor.	21/2			
	d)	Explain the working of RC coupled amplifier.	21/2			
		OR				
	e)	Describe Hund's Rule.	$2^{1/2}$			
	f)	Calculate emitter current I_E for a transistor for which $\beta=50$ and base current $I_B=30\mbox{ mA}$.	21/2			
	g)	Draw a circuit diagram for obtaining the characteristics curves of a N channel JFET and explain drain characteristics.	21/2			
	h)	Explain how on Op Amp can be used as non-inverting amplifier.	21/2			
5.		Attempt any ten from the followings.				
	a)	What are the allowed values of magnetic orbital quantum number for $\ell = 2$?	1			
	b)	What is the difference between L-S and J-J coupling?	1			
	c)	Draw the experimental arrangement of Stern-Gerlach experiment.	1			
	d)	How are the two junctions of transistor normally biased?	1			
	e)	Define stability factor.	1			
	f)	What do you mean by the term "thermal runway"	1			
	g)	What do the terms "Unipolar" and "bipolar" exactly mean?	1			
	h)	Why is the input impedance of JFET is very high?	1			
	i)	Draw the circuit symbol of depletion MOSFET.	1			
	j)	What are the advantages associated with dual power supply?	1			
	k)	Define class A amplifier.	1			
	l)	Draw symbol of an Op Amp.	1			
