[This question paper contains 2 printed pages.]

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Sr. No. of Question Paper	:	6661	D	Your Roll No	
Unique Paper Code	:	222581			
Name of the Course	: B.Sc. Mathematical Sciences				
Name of the Paper	:	Physics – II			
Semester	:	V			
Time : 3 Hours				Maximum Marks : 75	

Instructions for Candidates

- 1. Write your Roll No. on the top immediately on receipt of this question paper.
- 2. Question No. 1 is compulsory. Attempt any four questions from the rest.
- 3. All questions carry equal marks.
- 4. Calculators are not allowed.
- 1. Attempt any three of the following :
 - (a) Write down the Maxwell's equations for electromagnetic waves.
 - (b) What is atomic polarizability? Show that $\mathbf{p} = \alpha \mathbf{E}$.
 - (c) What do you understand by positive and negative feedback in amplifiers.
 - (d) Using 2's compliment method subtract 29 from 50.
 - (e) Write down the truth table of exclusive-OR gate and draw the logic circuit for the same using NAND gate.
- (a) State Gauss's Law of electrostatics and express it in its differential form.
 - (b) Show that the electric field strength at point P inside a spherically symmetric charge distribution is directly proportional to the distance of the point P from the centre of the spherical charge.
 (10)

 (3×5)

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3.	(a)	Explain Biot-Savart's Law. (4	5)			
	(b)	Show that the magnetic field B at the centre of a long solenoid is twice the of the end. (10)	at))			
4.	(a)	State Lenz's Law and give its application. (6	5)			
	(b)	Explain in detail the difference between paramagnetic, diamagnetic an ferromagnetic materials.	ıd ₹)			
5.	(a)	What do you mean by polarisation in dielectrics? (5	5)			
	(b)	Deduce a relation for the energy stored in a dielectric material. (10))			
6.	(a)	State Barkhausen's criterion for self-sustaining oscillations. (3	3)			
	(b)	Using a well labeled circuital diagram, find out the frequency for a Phase Shift Oscillator. (12)	;e 2)			
7.	(a)	Explain full-wave rectifiers and find the rectification efficiency and rippl factor for the same. (10)	le D)			
	(b)	How does a Zener Diode works as a voltage regulator? (5	5)			
8.	(a)	Prove the following identity by Boolean Algebra :				
		X + YZ = (X+Y)(X+Z) (5)	5)			
	ر ل ا	Draw a simulit for a half adden using NAND gates and write its trut	h			

(b) Draw a circuit for a half adder using NAND gates and write its truth table. (10)

(100)

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