

Enrollment No.....



Faculty of Science
End Sem (Even) Examination May-2019
BC3CO16 Physics - IV
 Programme: B.Sc. (CS) Branch/Specialisation: Computer
 Science

Duration: 3 Hrs.**Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. The number of electrons in 1 coulomb charge is : **1**
 (a) 5.46×10^{29} (b) 6.25×10^{18} (c) 1.6×10^{-19} (d) 90×10^{11}
- ii. Electron-volt is the unit of : **1**
 (a) Charge (b) Potential difference
 (c) Current (d) Energy
- iii. 1 Bohr Magneton is equal to : **1**
 (a) $9.28 \times 10^{-28} \text{ Am}^2$ (b) $9.28 \times 10^{-24} \text{ Am}^2$
 (c) $1.6 \times 10^{-19} \text{ Am}^2$ (d) $1.6 \times 10^{-34} \text{ Am}^2$
- iv. The intensity of magnetic field due to current I in a long straight wire is proportional to : **1**
 (a) I (b) I^2 (c) \sqrt{I} (d) $1/I$
- v. The time constant of CR circuit is: **1**
 (a) C/R (b) R/C (c) $1/CR$ (d) RC
- vi. The power loss in an alternating current circuit with pure inductance is : **1**
 (a) LI^2 (b) $1/2 LI^2$ (c) $2LI^2$ (d) Zero
- vii. The screen of the CRO is coated with **1**
 (a) Silver (b) Aquadag (c) Gold (d) None of these
- viii. The electric field inside the tubes of linear particle accelerator is: **1**
 (a) Zero
 (b) Dependent on the number of tubes
 (c) Independent on the number of tubes
 (d) Maximum
- ix. The electromagnetic waves were invented by: **1**
 (a) Faraday (b) Maxwell (c) Hertz (d) Marconi

P.T.O.

- x. The 'H' quantity is analogous to which component in the following: **1**
 (a) B (b) D (c) E (d) V
- Q.2 i. Define Unit Charge. **2**
 ii. Define Gauss law. **3**
 iii. What do you mean by the conservative nature of the electrostatic field? Obtain the relation between electric field and electric potential. **5**
- OR iv. Obtain expression for the capacity of a parallel plate condenser. If a dielectric medium is placed in between the plates, how is its capacity affected? **5**
- Q.3 i. Write Ampere's circuital law. **2**
 ii. What is Lorentz force? On its basis deduce the expression for the force acting on a current carrying conductor in a magnetic field. **8**
- OR iii. Write Biot-Savart's law and use it to establish an expression for the intensity of magnetic field produced at a point near a long straight current carrying conductor. **8**
- Q.4 i. Explain root mean square value of current and potential. **3**
 ii. Explain the growth and decay of current in L-R circuit. **7**
- OR iii. What are steady and non-steady currents? Derive equations of continuity for them. **7**
- Q.5 i. Briefly explain Bainbridge mass spectrograph. **4**
 ii. Draw the block diagram of CRO and explain the working of CRT in detail. **6**
- OR iii. Explain the principle and working of Cyclotron. **6**
- Q.6 Attempt any two:
 i. State Faraday's laws of electromagnetic induction. Obtain its integral and differential forms. **5**
 ii. Write down the Maxwell's equations in their differential and integral forms in an isotropic medium and deduce them. **5**
 iii. What is Poynting vector? Obtain the expression for it. **5**

Marking Scheme
BC3CO16 Physics – IV

Q.1	i.	The number of electrons in 1 coulomb charge is : (b) 6.25×10^{18}	1
	ii.	Electron-volt is the unit of : (d) Energy	1
	iii.	1 Bohr Magnetron is equal to : (b) $9.28 \times 10^{-24} \text{ Am}^2$	1
	iv.	The intensity of magnetic field due to current I in a long straight wire is proportional to : (a) I	1
	v.	The time constant of CR circuit is: (d) RC	1
	vi.	The power loss in an alternating current circuit with pure inductance is : (d) Zero	1
	vii.	The screen of the CRO is coated with (b) Aquadag	1
	viii.	The electric field inside the tubes of linear particle accelerator is: (a) Zero	1
	ix.	The electromagnetic waves were invented by: (b) Maxwell	1
	x.	The 'H' quantity is analogous to which component in the following: (c) E	1
Q.2	i.	Define Unit Charge. Definition 1 mark Formula 1 mark	2
	ii.	Define Gauss law. Formula 1 mark Diagram 1 mark	3
	iii.	Conservative nature of the electrostatic field 3 marks Relation b/w electric field and electric potential. 2 marks	5
OR	iv.	Expression for the capacity of a parallel plate condenser Definition 2.5 marks Derivation 2.5 marks	5

Q.3	i.	Write Ampere's circuital law. Law 1 mark Formula 1 mark	2
	ii.	Lorentz force Definition 3 marks Derivation 4 marks Diagram 1 mark	8
	OR iii.	Biot-Savart's law Definition 3 marks Derivation 4 marks Diagram 1 mark	8
Q.4	i.	Root mean square value of current and potential. Definition 1 mark Formula 1 mark Diagram 1 mark	3
	ii.	Growth and decay of current in L-R circuit. Definition 2 marks Derivation 4 marks Diagram 1 mark	7
	OR iii.	Steady and non-steady currents 2 marks Derivation of continuity for them. 5 marks	7
Q.5	i.	Bainbridge mass spectrograph. Diagram 1 mark Explanation 3 marks	4
	ii.	CRO and working of CRT Diagram 3 marks Explanation 3 marks	6
	OR iii.	Principle and working of Cyclotron. Diagram 1 mark Principle 2 marks Working 3 marks	6
Q.6	i.	Attempt any two: State Faraday's laws of electromagnetic induction Definition 1 mark Formula 2 marks Diagram 2 marks	5

ii.	Maxwell's equations in their differential and integral forms		5
	Definition	2.5 marks	
	Derivation	2.5 marks	
iii.	Poynting vector	2 marks	5
	Expression for it.	3 marks	
