

SEAT No. _____

[84/A-30]

SARDAR PATEL UNIVERSITY

S.Y. B.Sc, 4th SemesterMonday, 10th April 2017

Session: Evening, Time: 02:00 to 05:00 PM

Subject Code: (PHYSICS) US04CPHY01

Subject Title: Electromagnetic theory and spectroscopy.

Total Marks: 70

Que: 1

Write correct answer for each of the following MCQs.

[10]

- 1 The electric field is strong where the field lines are _____ together.
 - a) apart
 - b) closed
 - c) positive
 - d) negative
- 2 The electric field E is a negative gradient of _____.
 - a) F
 - b) V
 - c) K
 - d) ϕ
- 3 Generally directions of electric field and magnetic fields are _____.
 - a) uniform
 - b) parallel
 - c) perpendicular
 - d) None
- 4 The electric field _____ away from a positive charge.
 - a) curls
 - b) divergence
 - c) gradient
 - d) none
- 5 The magnetic monopole term is always _____.
 - a) Infinite
 - b) Positive
 - c) Zero
 - d) none
- 6 The line spectra is produced when the emitting element is in the _____ State.
 - a) molecular
 - b) Atomic
 - c) Both
 - d) none
- 7 Which of the following quantum number determined the shape of the orbit?
 - a) Orbital
 - b) Principal
 - c) Orbital-magnetic
 - d) none
- 8 Band spectra are also Known as _____ spectra.
 - a) line
 - b) atomic
 - c) molecular
 - d) absorption
- 9 The Bragg's law is _____.
 - a) $n\lambda = 2d\sin\theta$
 - b) $n\sin\lambda = 2d\theta$
 - c) $\sin\theta = 2d n\lambda$
 - d) none
- 10 X ray was invented by _____.
 - a) Daune Hunt
 - b) Moseley's
 - c) Auger
 - d) Rontgen

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Que 2 Write answers of any ten questions in brief. [20]

- 1 Define: Gradient, Divergence and Curl.
- 2 Deduce : $E = -\nabla V$
- 3 How much work will have to do in moving a charge from point a to point b?
- 4 Explain Lorentz force law.
- 5 Prove that work done by magnetic force is zero.
- 6 Write applications of Ampere's law.
- 7 Explain space quantisation.
- 8 Which type of coupling scheme is called j-j coupling?
- 9 What is luminescent and incandescent?
- 10 Compare X rays with ordinary light.
- 11 Write any four properties of X rays.
- 12 Write about : "auger electrons"

Que 3 [A] Give the statement of Gauss's law and deduce Gauss's law in differential and integral form. [06]

[B] Describe divergence of E. [04]

OR

Que 3 [C] Derive the expression for the energy of a point charge distribution. [06]

[D] Define electric potential and comment on it. And deduce electric potential of a localised charge distribution. [04]

Que 4 [A] Explain line, surface and volume current density. Also obtain continuity equation. [06]

[B] Discuss divergence and curl of B by using Biot-Sawart law. [04]

OR

Que 4 [C] Calculate magnetic field of a pure dipole by using multipole expansion of the vector potential. [06]

[D] Compare magneto static and electrostatic. [04]

Que 5 [A] Explain types of spectra. [07]

[B] What is wave number? [03]

OR

Que 5 [C] Give classical interpretation of normal Zeeman effect. [05]

[D] Explain resolution of spectral lines in an applied electric field by Stark effect. [05]

Que 6 [A] Explain continuous X ray spectrum and deduce Daune Hunt law. Also explain characteristic emission spectrum of X ray with diagram [10]

OR

Que 6 [B] State and explain Moseley's law with applications. Also explain in detail the Fluorescence yield. [10]

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