



DRR-3216

Third Year B. Sc. (Sem. VI) Examination

March / April - 2016

Physics : Paper - IX

Time : 2 Hours]

[Total Marks : 50

Instructions :

(1) नीचे दशविक निशानीवाणी विगतो उत्तरवही पर अवश्य कभवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
THIRD YEAR B. SC. (SEM. VI)

Name of the Subject :
PHYSICS : PAPER - 9

Subject Code No. : 3 2 1 6 Section No. (1, 2,.....) : NIL

Seat No. :

Student's Signature

- (2) All symbols have their usual meanings.
(3) Draw neat diagram wherever necessary.
(4) Figures on the right indicate full marks of the question

- 1 Answer the following in brief. [08]
- (1) What do you mean by free energy?
- (2) Give an example of Boson.
- (3) What are paramagnetic atoms?
- (4) What do you mean by quasistatic equilibrium process?
- (5) Why Lagrangian formulation is more convenient compared to the Newtonian formulation?
- (6) What do you mean by world point?
- (7) Explain the principle of covariance.
- (8) What is meant by space-like interval?
- 2 (a) Prove that $\langle P \rangle V = NKT$ for an ideal gas. [10]
- OR
- (a) Derive the Curie's law of paramagnetism by considering only simplified model. [10]

- (b) Why the lowest energy of a gas obeying F.D. statistics is much higher than that of the gas obeying B.E. statistics? [4]

OR

- (b) Find the possible microscopic states of 2 fermions system which has three fold degeneracy. [4]

- 3 (a) Find the relativistic Lagrangian of a single particle and justify it. [10]

OR

- (a) Explain "The Lorentz transformation can be regarded as a rotation of coordinate axes in space time". [10]

- (b) Show that length of a four vector is unchanged under a Lorentz transformation. [4]

OR

- (b) Derive the position Four Vector. [4]

- 4 Attempt **any two**: [14]

- (1) Write a short note on Gibb's Paradox.
 - (2) Give the physical interpretation of α .
 - (3) Derive the Lorentz gauge condition for Maxwell's equation to be invariant.
 - (4) Deduce the four velocity components in four dimensional Minkowski-space.
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