

ANDHRA LOYOLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8

II M.Sc. (PHYSICS) – III SEMESTER

II - MID SEMESTER EXAMINATION SEPTEMBER – 2018

ATOMIC PHYSICS - PAPER - I

TIME: 2 Hrs

MAX MARKS: 100

PART A

I. ANSWER THE FOLLOWING

(2 X 25=50)

1. (a) Determine the spectral terms for L-S coupling of atoms with two or more Non-equivalent optical electrons.

(OR)

- (b) Write the selection rules for multielectron system for L-S and j-j coupling.

2. (a) Explain normal and Anamolous Zeeman effect.

(OR)

- (b) Explain weak and strong field Stark effect in Hydrogen atom.

PART B

II. ANSWER ANY FIVE OF THE FOLLOWING

(5×10=50)

3. What are Normal and inverted multiplets.
4. Give Normal electron configuration and spectral terms of certain atoms
5. Explain order of Terms and Fine-structure levels.
6. Give the selection rules in j-j coupling.
7. Explain transition from weak to strong field Paschen-Back effect
8. Derive an expression for Lande's g-factor.
9. Explain Paschen-Back effect.
10. Derive an expression for magnetic moment of an atom.

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II M.Sc. (PHYSICS) – III SEMESTER

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NUCLEAR PHYSICS - PAPER-II

TIME : 2 Hrs.

Max Marks:100

PART A

I. Answer the following.

(2 X 25 = 50)

1. Discuss ground state of deuteron.

(OR)

What are exchange forces? Explain them.

2. What is Q-value of a nuclear reaction. Derive an expression for it.

(OR)

Explain different kinds of nuclear reactions and their conservation laws.

PART B

II. Answer any five of the following

(5 X 10 = 50)

3. Discuss meson theory of nuclear forces.
4. Derive an expression for the threshold energy of nuclear reactions.
5. What is compound nucleus. Explain
6. Discuss the characteristics of nuclear forces.
7. Compare different types of forces.
8. Explain nuclear reaction cross-section.
9. Derive Breit-Wigner dispersion formula for resonance scattering.
10. Explain exoergic and endoergic reactions.

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II M.Sc. (PHYSICS) – III SEMESTER
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NUCLEAR PHYSICS - PAPER-II

TIME : 2 Hrs.

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II. Answer any five of the following

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3. Discuss meson theory of nuclear forces.
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6. Discuss the characteristics of nuclear forces.
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8. Explain nuclear reaction cross-section.
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ANDHRA LOYOLA COLLEGE (Autonomous)
II M.Sc. (PHYSICS) - III SEMESTER -
II MID SEMESTER EXAMINATION SEPTEMBER-2018
PAPER – III: PROPERTIES OF SOLIDS

TIME: 2 Hrs

MAX MARKS: 100

PART A

I. ANSWER THE FOLLOWING

(2X25 = 50)

1. (a) Discuss about the decay mechanisms in Luminescence.
(OR)
(b) Define thermal conductivity. Show that lattice thermal conductivity is proportional to specific heat.
2. (a) Explain photoelectric effect in alkali halides. Describe the production of color centers in ionic crystals by irradiation of X-rays.
(OR)
(b) Explain the transformation of F centers into F^+ centers and vice-versa.

PART B

II. ANSWER ANY FIVE OF THE FOLLOWING

(5X10=50)

3. Explain phonon-phonon scattering
4. Discuss different types of luminescence.
5. Give the color centers resulting from excess halogen.
6. Discuss general remarks on luminescence.
7. Give the color centers resulting from excess metal.
8. Discuss briefly the excitation and emission processes in luminescence.
9. Give the classification of color centers in alkali halides
10. Explain in how many ways electronic excitation takes place

ANDHRA LOYOLA COLLEGE (AUTONOMUS)
II M.Sc (PHYSICS) SEMESTER-III
II MID SEMESTER EXAMINATION SEPTEMBER-2018
PAPER IV: GLASS SCIENCE AND TECHNOLOGY

Time: 2 Hrs

Max Marks: 100

PART A

I. ANSWER THE FOLLOWING

(2x25= 50)

1. (a) Describe the structural model for alkali silicate glasses with respect to Q_n structural Units.

(OR)

(b) Describe in detail the structural model for alkali borate glasses.

2. (a) Describe the following techniques to determine viscosity glass melts

(i) Rotation Viscometers and (ii) Beam-Bending Viscometers.

(OR)

(b) Discuss the compositional dependence of viscosity in silicate and borate glass melts

PART B

II. ANSWER THE ANY FIVE OF THE FOLLOWING

(5x10= 50)

3. Explain structural model for vitreous silicate glasses
4. Write a note on borate anomaly in borate glasses
5. Describe structural model for alkali borosilicate glasses.
6. How the viscosity of glass melts measured by fiber elongation method.
7. Explain VFT equation to explain the non Arrhenian behavior in glass melts
8. Write a note on fragility diagrams for glass melts.
9. Write difference between Strong melts and fragile melts.
10. Explain the influence of Al_2O_3 in alkali/alkaline earth silicate glasses

ANDHRA LOYOLA COLLEGE (Autonomous):: VIJAYAWADA-520008
II M.Sc. (PHYSICS) - III SEMESTER
II MID SEMESTER EXAMINATION – SEPTEMBER- 2018
Paper-V: Dielectrics, Ferroelectrics & High Temperature Superconductors

TIME: 2 Hrs

MAX MARKS: 100

PART A

I. ANSWER THE FOLLOWING

2 X 25 = 50

1. (a) Explain in detail the Ginzburg-Landau theory of superconductivity.
OR
(b) Explain DC and AC Josephson effects in superconductivity by deriving the expressions for Josephson currents
2. (a) Discuss the dipole theory of ferroelectricity.
OR
(b) Discuss theory of spontaneous polarization of BaTiO₃.

PART B

II. ANSWER ANY FIVE OF THE FOLLOWING

5 X 10 = 50

3. Explain Macroscopic quantum interference
4. Discuss briefly the classification and properties of ferroelectrics.
5. Write a short note on high temperature superconductivity.
6. Discuss briefly about the applications of superconductivity.
7. Give a brief account of the new class of oxide superconductors.
8. Write a short note on applications of ferroelectrics.
9. Explain the nature of ferroelectric domains.
10. Write a short note on general properties of ferroelectric materials.
