Enrollment No:-_____   Exam Seat No:-_____

C.U.SHAH UNIVERSITY
Summer-2015

Subject Code: 4SC03PHE1   **Subject Name: Modern Physics**
Course Name:B.Sc. (Pure)   Date: 11/5/2015
Semester:III   Marks: 70
                                                                Time:02:30 TO 05:30

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Instructions:
1) Attempt all Questions of both sections in same answer book/Supplementary.
2) Use of Programmable calculator & any other electronic instrument prohibited.
3) Instructions written on main answer book are strictly to be obeyed.
4) Draw neat diagrams & figures (if necessary) at right places.
5) Assume suitable & perfect data if needed.

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SECTION-I

Q-1   All Questions are compulsory
                                                                                              7

1. What is cantilever?
2. What is unit of viscosity coefficient?
3. Give the statement of Stoke's law.
4. Define: Inertial reference frame.
5. How much energy release from 1 kg of uranium. (C = 3×10^8 m/s).
6. What is a microscopic state?
7. What is unit of Reynolds's number?

Q-2   Answer the following in detail.
1. Explain bending moment of a beam and derive its formula.   5
2. Derive the formula for the Young's modulus of a cantilever, when loaded at
   the free end.   5
3. A 1.5 kg load is tied at the free end of a cantilever of $60x10x10cm^3$ having
   Y = 10^{11} Pa. Calculate the depression in the bar.   4

OR
1. Explain construction, working, theory and result of Michelson–Morley
   experiment.   7
2. Explain: Length contraction and Time dilation.   7

Q-3   Answer the following in detail.
1. Explain: Entropy of a perfect gas in a microcanonical.   5
2. Obtain the equation of mass-energy relation.   5
3. Write short notes on Phase space.   4

OR
1. Derive Poiseuille's formula for the rate of flow of a liquid through a
   capillary tube.   7

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11-5

2. Obtain the terminal velocity of tiny solid metal sphere in viscous medium. 7

SECTION-II

Q-4 All Questions are compulsory **7**

1. What is the unit of $1/\sqrt{\varepsilon_0\mu_0}$?
2. Calculate the frequency of 3000 A^o of radiation.
   (C = 3 × 10^8 m/s).
3. What is the region of visible light in A^o?
4. Calculate the energy of radiation of 400 nm wavelength in eV.
   (h = 6.6 × 10^{-34} J-S.)
5. Define orbital quantum number.
6. What is Auger effect?
7. What is wave length of X- ray.

Q-5 Answer the following in detail.
1. Explain production of X-ray by Coolidge tube. 5
2. Describe Bragg's law for X-ray diffraction. 5
3. Write in detail applications of X rays. 4
<div align="center">OR</div>

1. Explain: Electron spin and space quantization. 5
2. Write a short note: Stark's effect. 5
3. Write a short note: Electromagnetic spectrum. 4

Q-6 Answer the following in detail.
1. What is Zeeman Effect? Explain Normal Zeeman Effect. 5
2. Write a short note: Continuous characteristic emission spectrum. 5
3. Write a short note: Electromagnetic spectrum. 4
<div align="center">OR</div>

1. Write a short note: Bragg's spectrometer. 5
2. Write a short note on Moseley's Law. 5
3. Write in detail Anomalous Zeeman effect. 4

11-5