SUBJECT CODE : 11PH/MC/PA14

B.Sc. DEGREE EXAMINATION NOVEMBER 2011
BRANCH III - PHYSICS
FIRST SEMESTER

REG. No._____

COURSE	:	MAJOR – CORE
PAPER	:	PROPERTIES OF MATTER AND ATOMIC PHYSICS
TIME	:	30 MINS.

MAX. MARKS : 30
SECTION – A
TO BE ANSWERED IN THE QUESTION PAPER ITSELF

ANSWER ALL QUESTIONS: (30 x 1 = 30)
I **CHOOSE THE CORRECT ANSWERS:**

1. Rigidity modulus is
    a) $\underline{Stress}$ b) $\underline{Tangential\ stress}$ c) $\underline{Bulk\ stress}$ d) $\underline{Strain\ linear}$
       Strain   tangential strain   Bulk strain   Stress linear

2. The dimension of strain is
    a) $ML^{-1}T^{-2}$ b) $ML^{-2}T^{-2}$ c) MLT^{-2} d) No dimension

3. The ratio of bulk stress to bulk strain is
    a) young's modulus b) rigidity modulus c) bulk modulus
    d) modulus of elasticity

4. The unit of surface tension is
    a) N b) N-m c) N-s d) $N\text{-}m^{-1}$

5. A needle floating on surface of water exhibits
    a) Surface tension b) viscosity c) conductivity d) elasticity

6. The Angle of contact of glass with mercury is
    a) 35^0 b) 0° c) 121° d) 131°

7. For streamline flow, the value of Reynolds number is
    a) 0 and 2000 b) 2000-3000 c) 3000-4000 d) 4000-5000

8. The motion of a metal sphere through highly viscous liquid is
    a) stokes b) poisuilles c) keplers d) Newton's

9. Canal rays are also called
    a) β rays b) positive rays c) α rays d) x rays

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10. The unit of wavelength is
    a) meter   b) A°   c) cm   d) all the above

11. Nobel prize was – awarded to Einstein for
    a) Einstein - mass energy relation   b) Einstein - relativistic equation
    c) Einstein - photoelectric equation   d) Einstein - negative energy

12. Splitting of spectral lines due magnetic field is
    a) Zeeman   b) stark   c) Paschen   d) electric

13. Mass Number is
    a) Number of protons   b) Number of neutrons
    c) Number of protons and neutrons   d) Number of electrons

14. Bragg's law states
    a) $2d \sin \theta = n\lambda$ b) $2d \sin \theta = d$ c) $2d \sin \theta = nd$ d) $2d = d$

15. Na^{23} has the electronic structure
    a) $1s^2\ 2s^2\ 2p^6\ 3s^1$ b) $1s^2\ 2s^2\ 2p^6\ 3s^2$
    c) $1s^2\ 2s^2\ 2p^6\ 3s^3$ d) $1s^2\ 2s^2\ 2p^6\ 3s^4$

II   **FILL IN THE BLANKS:**
16. Reynold's number of Turbulent flow is _____

17. The angle of contact of glass with water is _____

18. Viscosity is defined as _____

19. Electrons have spin _____

20. Splitting of lines in electric field is _____

III   **STATE WHETHER TRUE OR FALSE:**

21. Three different states of matter is solid, liquid and gas.

22. Stress has no dimension

23. Force between like molecules is _____

24. Einstein – mass energy relation is _____

25. The Pauli's exclusion principle states that _____

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IV **ANSWER BRIEFLY:**

26. What is bending moment?

27. What are torsional oscillation?

28. Define surface tension.

29. What is angle of contact?

30. Define Compton effect.

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SECTION – B
ANSWER ANY FIVE QUESTIONS: **(5 x 5 = 25)**

1. What torque must be applied to a wire one meter long, 10^{-3} meter in diameter in order to twist one end of it through 90°, the other end remaining fixed. The rigidity of material used is 2.8×10^{10} Nm^{-2}.

2. Water flows through a horizontal tube of length 0.2m and Internal radius 8.1×10^{-4}m under a constant head of liquid 0.2m high. In 12 minutes 8.6×10^{-4} m^3 of liquid issues from the tube. Calculate coefficient of viscosity of water. (The density of water = 1000 kg m^{-3} and g = $9.81 ms^{-2}$).

3. The pressure of air in a soap bubble of 7×10^{-3} diameter is 8×10^{-3}m of water above atmospheric pressure, calculate the S.T. of soap solution.

4. An x ray diffraction of a crystal gave the closest line at an angle of 6° 27. If the wavelength of x rays is $0.58A^{\circ}$, find the distance between two clevage planes.

5. Write note-on Bragg's law.

6. The maximum kinetic energy of electrons emitted from a metallic surface is IeV when the frequency of incident radiation is 7.5×10^{14} HZ calculate the minimum frequency of radiation for which the electrons will be emitted.

7. Explain vector atom model.

SECTION – C
ANSWER ANY THREE QUESTIONS: **(3 x 15 = 45)**

8. Obtain relation between different elastic moduli

9. Define angle of contact. Explain Jaeger's method of obtaining surface tension.

10. State stoke's law. Explain rotation viscometer for obtaining viscosity of highly viscous liquid.

11. State laws of photoelectric effect. Explain Einstein photoelectric equation and give the experimental verification of photoelectric equation.

12. Explain Stern and Gerlach's experiment. Define Bohr magneton.

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