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END SEMESTER REGULAR EXAMINATION, MAY/JUNE – 2025

Semester : 2nd (NEP)

Branch : All

Course Code : BS-202

APPLIED PHYSICS - II

Full Marks – 60

Pass Mark – 24

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instruction :

- *All* questions are compulsory.

1. Fill in the blanks : 1×5=5

   (a) The size of nanoparticle is _____.

   (b) _____ is the property of fluids by virtue of which they tend to destroy any relative motion between their layers.

   (c) The power of a convex length 25 cm is _____.

[Turn over

(d) _____ is the surest test of magnetism.

(e) The number of photo electrons emitted depends on the _____ of incident wave.

2. Write True or False : 1×5=5

(a) At dew point actual VP becomes equal to saturated VP.

(b) The motion in which it repeats itself periodically after regular intervals of time is the periodic motion.

(c) Laser is a device for producing charged particles.

(d) Principle of transmission of pressure is stated by Pascal's Law.

(e) When the listener approaches, the pitch increases.

3. Choose the correct answer : 1×5=5

(a) If the temperature in Celsius scale is 20°C, in Kelvin scale it is

(i) 290 K (ii) 320 K

(iii) 293.15 K (iv) 293 K

(b) Raindrops are spherical because of

(i) The gravitational effect of Earth

(ii) Surface tension of water

(iii) The nature of water

(iv) None of these

(c) The velocity of sound is independent of

(i) Density (ii) Humidity

(iii) Temperature (iv) Pressure

(d) The focal length of a plane mirror is

(i) Zero

(ii) Infinity

(iii) Negative infinity

(iv) None of these

(e) Angle of dip at poles is

(i) 90 degrees (ii) 45 degrees

(iii) 60 degrees (iv) 0 degrees.

4. (a) State Hooke's Law and hence define Young's modulus of electricity. 1+1=2

(b) Find an expression of pressure at any point within a liquid. 2

(c) Write two differences between heat and temperature. 2

(d) (i) What force is equivalent to stretch a steel wire to double its length and when its cross-sectional area is 1 cm^2 uniformly across the rod and $Y = 2 \times 10^{12}$ dyne/cm^2 ? 2

Or

(ii) What are the working conditions of a siphon ? 2

(e) Write any two applications of nanoparticles. 1

5. (a) State Newton's formula for velocity of sound in air. Write the relationship among Velocity, Wavelength and Frequency. 1+1=2

(b) Write two differences each from any *two* of the followings : 2×2=4

(i) Longitudinal wave and Transversal wave.

(ii) Progressive wave and Stationary wave.

(iii) Echo and reverberation.

(c) Define any *three* of the following : Calorie, Specific heat Capacity, Thermal conductivity, Latent heat, Coefficient of linear expansion. 3

6. (a) Define real image. With a neat ray diagram show how a real image is formed by a concave mirror. 1+2=3

(b) An object is placed at 30 cm in front of a convex lens whose radius of curvature is 40 cm. Find the position and nature of the image. 3

(c) (i) State the conditions for total internal reflection. 2

Or

(ii) Define acceptance angle and a numerical aperture of optical fibre. 2

(d) Write two industrial applications of X-Rays. 1

7. (a) (i) State and explain Coulomb's Law of magnetism. 3

Or

(ii) Deduce an expression of magnetic intensity due to a magnetic dipole on end-on position. 3

(b) Define magnetic lines of force. Write two properties of magnetic lines of force. 1+2=3

(c) Write two properties of α, β and γ radiation. 3

8. (a) (i) State and explain Einstein Photo electric equation. 3

Or

(ii) Explain the principle of lasers. What is population inversion ? 3

(b) Define evaporation. Write the factors on which rate of evaporation depend. 3

(c) (i) 40 gm of water at 60°C are poured into a calorimeter whose temperature is 20°C. The final temperature is 45°C. Find the thermal capacity of the calorimeter. 3

Or

(ii) State Joules Law of heat and define mechanical equivalent of heat. What is the heat engine ? 3