

25PY101 (S2): Engineering Physics

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Test 1: Physical quantities

Engineering prefixes, symbols, Dimensions

Name: _____

Total marks: 21

Registration No.: _____

Instructions:

For the multiple-choice type questions, there is only **one** correct answer.

For the assertion-reason type questions, select the correct option: (a) A and R are true, and R is the correct explanation of A.

(b) A and R are true, but R is not the correct explanation of A.

(c) A is true, R is false.

(d) A is false, R is true.

Metric Prefixes and Scales

Q1. 1 mA (milliampere) is equal to:

- (a) 10^{-6} A (b) 10^{-3} A (c) 10^{-9} A (d) 10^3 A

Q2. $5\ \mu\text{m}$ (micrometers) is equal to:

- (a) 5×10^{-3} m (b) 5×10^{-6} m (c) 5×10^{-9} m (d) 5×10^6 m

Q3. The wavelength of visible light is about 500 nm. Express this in meters:

- (a) 5×10^{-7} m (b) 5×10^{-6} m (c) 5×10^{-9} m (d) 5×10^{-3} m

Q4. 1 MeV (mega electron-volt) is equal to:

- (a) 10^3 eV (b) 10^6 eV (c) 10^9 eV (d) 10^{12} eV

Q5. Which of the following is the smallest quantity?

- (a) 1 mA (b) $1\ \mu\text{A}$ (c) 1 nA (d) 1 A

Greek symbols

- Q6. The symbol σ is the Greek letter
(a) gamma (b) sigma (c) nu (d) delta
- Q7. σ is related to the English letter:
(a) A (b) C (c) S (d) T
- Q8. The symbol σ represents:
(a) Resistivity (b) Conductivity (c) Permittivity (d) Charge density
- Q9. The symbol ρ in electrical conduction usually denotes:
(a) Density of electrons (b) Resistivity (c) Potential difference (d) Current
- Q10. Assertion (A): The SI unit of conductivity is S/m.
Reason (R): Conductivity is the reciprocal of resistivity.

Dimensional analysis

- Q11. The dimensions of velocity are:
(a) $[LT^{-1}]$ (b) $[L^2T^{-2}]$ (c) $[LT^{-2}]$ (d) $[T^{-1}]$
- Q12. Dimensions of linear momentum are:
(a) $[MLT^{-1}]$ (b) $[ML^2T^{-2}]$ (c) $[MLT^{-2}]$ (d) $[MT^{-1}]$
- Q13. The dimensional formula of kinetic energy is same as:
(a) Torque (b) Power (c) Work (d) Force
- Q14. Assertion (A): The dimensional formula of work and energy are different.
Reason (R): Work and energy represent different physical concepts but have identical units.

Scientific notation

- Q15. Express 0.00047 in scientific notation: (a) 4.7×10^{-3} (b) 4.7×10^{-4} (c) 47×10^{-5}
(d) 47×10^{-6}
- Q16. The height of Statue of Unity is 182 m. Its height is of the **order of**
(a) 10^1 m (b) 10^2 m (c) 10^0 m (d) 10^3 m
- Q17. If radius of atom is 2×10^{-10} m, then its volume is of the **order of**
(a) $10 \times 10^{-29} \text{ m}^3$ (b) 10^{-29} m^2 (c) $10 \times 10^{-29} \text{ m}^3$ (d) $10 \times 10^{-29} \text{ m}$

Electric field

- Q18. The plates of a parallel plate capacitor are under potential difference of V . If the separation between the plates is ℓ , then the electric field between the plates is given by:
(a) $V\ell$ (b) $\frac{V}{\ell}$ (c) $V\ell^2$ (d) None

Q19. Electric field E is related to potential V as:

(a) $E \propto V$ (b) $E \propto \frac{1}{V}$ (c) $E = -\frac{dV}{dx}$ (d) $E = Vx$

Q20. The energy of an electron accelerated through potential V is:

(a) $E = qV$ (b) $E = \frac{q}{V}$ (c) $E = \frac{V}{q}$ (d) $E = q^2V$

Q21. Assertion (A): Electric field is the negative gradient of potential.

Reason (R): Work done by an electric field depends only on initial and final positions, not on the path.

End of Test