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NEET UG SPECIAL CHAPTER WISE TEST   NKP-01

Q. Types : Easy	Moderate	Difficult	Total
Q. Number : 20	20	10	50
Max. Marks : 80	80	40	200

ALL INDIA TEST SERIES

TOPIC-Unit and Dimension

Date	05 July-24
Time	50 minutes

INSTRUCTIONS-

❖ This test is purely based on pattern of NEET(UG)–2025

❖ Before attempting the question paper ensure that it contains all the pages and no question is missing.

❖ The important points to note:

- Each question carries 04 (four) marks and, for each correct answer candidate will get 04 (four) marks.
- For each incorrect answer, 01 (one) mark will be deducted from the total score.
- To answer a question, the candidate has to find, for each question, the correct answer/ best option.
- However, after the process of the challenge of key, if more than one option is found to be correct then all/any one of the multiple correct/best options marked will be given four marks (+4).
- Unanswered/Unattempted questions will be given no marks. In case, a question is dropped/ ignored, all candidates will be given four marks (+4) irrespective of the fact whether the question has been attempted or not attempted by the candidate.

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1. A Unitless Quantity -
(a) never has a non-zero dimension
(b) always has a non-zero dimension
(c) may have a non-zero dimension
(d) does not exist

2. The diameter of a spherical bob,when measured with vernier callipers yielded the value : 3.33cm,3.32cm,3.34cm.the mean diameter to appropriate significant figure is -
(a) 3.328cm
(b) 3.3cm
(c) 3.33cm
(d) 3.32cm

3. The unit of physical quantity obtained by the line integral of electric field is -

(a) NC^{-1}
(b) VM^{-1}
(c) JC^{-1}
(d) $C^2N^{-1}m^{-2}$

4. If E = energy, G = gravitational constant , I = impulse & M = mass, then dimension of GIM^2/E^2 are same as that of -
(a) Time
(b) Mass
(c) Length
(d) Force

5. Which of the following sets of quantities have same dimensional formula -
(a) Frequency , Angular Frequency , Angular Momentum
(b)Surface Tension , Stress & Spring Constant
(c) Acceleration , Momentum & Retardation
(d)Work , Energy & Torque

6. The Dimensional Formula $[MLT^{-2}A^{-2}]$ belong to the -
(a) Electric Permittivity
(b) Magnetic Flux
(c) Self Inductance
(d) Magnetic Permeability

7. The refractive index of water is u=4/3 The number of significant figure is -

(a) 3
(b) 2
(c) 1
(d) Infinity/∞

8. In a new system of units, unit of mass is α kg, unit of length is β m, unit of time is γ seconds. In this system 10j will be represented as -

(a) 10α-1β-2γ2
(b) 10α-2**β**-1γ-2
(c) 10α-2**β**-2γ2
(d) 10α**β**2γ-2

9. A physical quantity z depends upon four observation a, b , c and d as $\frac{z=a^2\ b^{2/3}}{\sqrt{c}\ d^3}$

The % of error in the measurement of a, b, c and d are 2%, 1.5%, 4% and 2.5% respectively

The % error in z is

(a)12.25%
(b) 16.5%
(c) 13.5%
(d) 14.5%

10. If F= ax + bt, wherew F= force , x = distance, t= time. Then the dimension of a/b is

(a) $\sqrt{\frac{T}{L}}$
(b) $\frac{\sqrt{T}}{L}$
(c) $T^{-3/2}L^2$
(d) MLT^{-2}

11. The time dependence of physical quantity p is given by p = $p_o\ e^{-\alpha t}$ where is a constant and t is the time. The constant is —
(i) Dimensionless
(ii) Has dimensions T^2
(iii) Has dimensions of P
(iv) Has dimensions T^{-2}

12. Taking into account the significant figures, what is the value of (9.99m- 0.0099m) ?
(a) 9.98 m
(b) 9.980 m

(c) 9.9 m

(d) 9.9801 m

13. The Dimension of ½ $E_o E^2$ (E_o = permittivity of free space, E = electric field)

(i) ML^2T^{-1}

(ii) $ML^{-1}T^{-2}$

(iii) $ML^2T^{-2}A^{-1}$

(iv) $ML^2T^{-2}A^{-2}$

14. A screw gauge gives the following reading when used to measure the diameter of a wire (main scale reading = 0 mm, circular scale reading = 52 divisions)

Given that 1mm on main scale corresponds to 100 divisions of the circular scale. The diameter of wire from above data is -

(i) 0.052 cm

(ii) 0.026 cm

(iii) 0.005 cm

(iv) 0.52 cm

15. A vernier callipers has 1 mm marks on the main scale. It has 20 equal divisions on the vernier scale which match with 16 main scale divisions. For this vernier callipers. The least count is –

(i) 0.02 mm

(ii) 0.05 mm

(iii) 0.1 mm

(iv) 0.2 mm

16. In terms of potential difference V, electric current I, permittivity E_o , permeability μ_o and speed of the light c, the dimensionally correct equation is –

(i) $\mu_o I^2 = E_o v^2$

(ii) $E_o I = \mu_o v$

(iii) $1 = E_o C^2 v$

(iv) $\mu_o c I = E_o v$

17. Given that y= A sin [$\frac{2\pi}{\lambda}$(ct-x)] , where y and x are measured in meter. Which of the following statement is true —

(a) The unit of λ is same as that of x and A

(b) The unit of λ is same as that of x but not of A.

(c) The unit of c is same as that of $\frac{2\Pi}{\lambda}$

(d) The unit of (ct-x) is same as that of $\frac{2\Pi}{\lambda}$

18. The force of interaction between two atoms is given by F=$\alpha\beta e^{[\frac{-x^2}{\alpha kT}]}$

Where x is the distance, K is the Boltzmann constant and T is temperature and α and β are two constants The dimensions of β is -

(a) $[M_o L^2 T^{-4}]$

(b) $M^2 L T^{-4}]$

(c) $[M L T^{-2}]$

(d) $M^2 L^2 T^{-2}]$

19. If the screw on a screw gauge is given six rotations, it moves by 3mm on the main scale of these are 50 divisions on the circular scale, the least count of the screw gauge is –

(a) 0.001cm

(b) 0.02cm

(c) 0.01cm

(d) 0.001cm

20. In an experiment voltage(v) & current(I) are given as V = (200 $\pm$ 0.2) Volt. and I = (20 $\pm$ 0.2) A, the % error in the resistance(R) is-

(a) 2%

(b) 7%

(c) 10%

(d) 8%

21. In force(F), velocity(v), and time(T) are taken as fundamental units then the dimensions of mass are:-

(a) FVT^{-1}

(b)FVT^{-2}

(c) $FV^{-1}T^{-1}$

(d) $FV^{-1}T$

22. In a vernier callipers one main scale division is x cm and n division of the vernier scale coincide with (n-1) divisions of the main scale. The Least count of the callipers is -

(a) $\left(\frac{n-1}{n}\right)x$

(b) $\frac{nx}{(n-1)}$

(c) $\frac{x}{n}$

(d) $\frac{x}{(n-1)}$

23. A physical quantity is given by X = $M^a L^b T^c$. The %age error in measurement of M, L & T are α, β and γ respectively. The maximum % error in the quantity X is -

(a) $A\alpha + B\beta + C\gamma$

(b) $A\alpha + B\beta - C\gamma$

(c) $\frac{A}{\alpha} + \frac{B}{\beta} + \frac{C}{\gamma}$

(d) None of these

24. The potential energy of a particle varies with distance x from a fixed origin as U = ($\frac{A\sqrt{x}}{x+b}$); where A and B are constant. The dimensions of AB are-

(a) $\left[ML^{\frac{s}{2}}T^{-2}\right]$

(b) $\left[ML^2T^{-2}\right]$

(c) $\left[M^{\frac{3}{2}}L^{\frac{3}{2}}T^{-2}\right]$

(d) $\left[ML^{\frac{7}{2}}T^{-2}\right]$

25. A student measured the length of a rod and wrote it as 3.50 cm which instrument did he used to measure it ?

(a) A meter scale

(b) A vernier calliper where 10 divisions in vernier scale matches with 9 divisions in main scale and the main scale has 10 divisions in 1cm

(c) A screw gauge having 100 divisions in the circular scale and pitch has 1mm

(d) A screw gauge having 50 divisions in the circular scale and pitch as 1mm

26. The frequency of the vibration of string is given by $\theta = \frac{p}{2l}\left[\frac{F}{m}\right]^{\frac{1}{2}}$ here p is number of segments in the string, l is the length and F is tension, the dimensional formula for m will be:-

(a) $[M^O L T^{-1}]$

(b) $[M L^O T^{-1}]$

(c) $[M L^{-1} T^O]$

(d) $[M^O L^O T^O]$

27. If P, Q, R are physical quantities having different dimensions, which of the following combinations can never be a meaningful quantity ?

(a) (P- Q)/ R

(b) PQ-R

(c) PQ/R

(d) (PR-Q2)/ R

(e) (R+Q)/P

Choose The Correct Option: -

(a) (a , e)

(b) (a , d , e)

(c) (a , c , d)

(d) (b , d)

28. Planks Contant (h), speed of light in vacuum (c) and Newtons gravitational constant (G) are the three fundamental constant. Which of the following combination of these has the dimension of length?

(i) $\frac{\sqrt{hG}}{C^{\frac{3}{2}}}$

(ii) $\frac{\sqrt{hG}}{C^{\frac{5}{2}}}$

(iii) $\sqrt{\frac{hC}{G}}$

(iv) $\sqrt{\frac{Gc}{h^{3}/_2}}$

29. What is the dimensions of energy in the terms of linear momentum[p], area[a] and Time[T]?

(i) $[P^1 A^1 T^1]$

(ii) $[P^2 A^2 T^{-1}]$

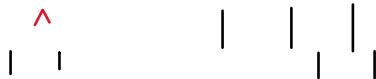(iii) $[P^1 A^{1/2} T^{-1}]$

(iv) $[P^{1/2} A^{1/2} T^{-1}]$

30. A physical quantity of the dimensions of length that can be formed out of C, G and $e^2/4\pi\varepsilon^\circ$ is (c is the velocity of light, G is universal constant of gravitation and e is charge) -

(i) $\frac{1}{C^2}\left[G\frac{e^2}{4\pi\varepsilon^\circ}\right]^{1/2}$

(ii) $C^2 \left[G \dfrac{e^2}{4\pi\varepsilon^\circ} \right]^{1/2}$

(iii) $\dfrac{1}{C^2} \left[G \dfrac{e^2}{G4\pi\varepsilon^\circ} \right]^{1/2}$

(iv) $\dfrac{1}{C} \left[G \dfrac{e^2}{4\pi\varepsilon^\circ} \right]$

31. **The diagram shows part of vernier scale on a pair of callipers which reading is correct?**

(Least count = 0.01cm)

(i) 2.74 cm
(ii) 3.10 cm
(iii) 3.26 cm
(iv) 3.64 cm

32. The no. of significant figures in all the measured value 25.12, 200.9, 4.156 and 1.217×10^{-4} is -
(i)   1
(ii) 2
(iii) 3
(iv) 4

33. A small metallic ball moves through a fluid with a speed 'v' in downward direction, experiences a force F, acts in upward direction. Experimentally the magnitude of this force depends on radius 'r' of ball, velocity 'v' of ball & viscosity 'η' of fluid. The correct relation b/w F, r, v, & η is given by -

(a) $F \propto \eta r v$
(b) $F \propto \eta^2 r v$
(c) $F \propto \eta r^{-2} v$
(d) $F \propto \eta^{-1} r^{-1} v^{-1}$

34. The wrong unit conversion among the following is –
(a) 1 Femi $= 10^{-15} m$
(b) 1 Parsec $= 3.08 \times 10^{-16} m$
(c) 1 Light Year $= 9.46 \times 10^{-15} m$
(d) 1 Astronomical Unit $= 1.496 \times 10^{-11} m$

35. . The SI unit of thermal conductivity is :-

(a) $J m^{-1} K^{-1}$
(b) $W m\ K^{-1}$
(c) $W m^{-1} K^{-1}$
(d) $J m\ K^{-1}$

36. In terms of basic units of Mass(M), length(L), time(T) & charge(Q), the dimensions of magnetic permeability of vacuum (μ_o) would be :-
(a) $[MLG^{-2}]$
(b) $[LT^{-1}Q^{-1}]$
(c) $[ML^2T^{-1}Q^{-2}]$
(d) $[LTQ^{-1}]$

37. The three physical quantities x, y & z have units $G_o M^2 s^{-5}$, $g s^{-1}$ & $cm s^{-2}$ respectively. The relation between x, y & z is —
(a) $x = y z^2$ (b) $x = y^2 z$
(c) $y^2 = xz$ (d) $z = x^2 y$

38. Of the absolute errors in two physical quantities A & B are a & b respectively, then the absolute error in the value of A-B are –

(a) b - a
(b) $a \neq b$
(c) a + b
(d) a - b

39. If n denotes a positive integer, h the Plank's constant, e the charge & B the magnetic field, the quantity $[\dfrac{nhe}{2\pi gB}]$ has the dimensions of

(a) Area
(b) Length
(c) Speed
(d) Acceleration

40. A student measured the diameter of a small steel ball using a screw gauge of least count 0.001 cm. The main scale reading is 5mm & zero of circular scale division coincides with 25 divisions above reference level. If screw gauge has a zero error of -0.004 cm, the correct diameter of the ball is-

(a) 0.53 cm

(b) 0.0525 cm
(c) 0.521 cm
(d) 0.529 cm

41. Q41 Which of the following statements is/are correct?

(I) A screw gauge having a smaller value of pitch has greater accuracy.

(II) The least count of screw gauge is directly proportional to the no. of divisions on circular scale.

(a) Only I
(b) Only II
(c) Both I and II
(d) None of these

42. Match The Following Columns

Column I	Column II
(a) R/L	(p) Time
(b) CR	(q) Frequency
(c) E/B	(r) Speed
(d) $\sqrt{\varepsilon_o \mu_o}$	(s) None

(a) A-p , B-r , C-q , D-s
(b) A-s , B-q , C-p , D-r
(c) A-q , B-p , C-r , D-s
(d) A-p , B-r , C-s , D-q

43. Which of the following statement is incorrect?

(a) Systematic errors & random errors fall in the same group of errors
(b) Both systematic & random errors are based on the cause of error.
(c) Absolute error can't be negative.
(d) Absolute error is the difference b/w the real value & the measured value of a physical quantity.

44. . Match the Column I with Column II & mark the correct option from the codes given below:

Column I	Column II

(A) Electrical Resistance	1. $[ML^3T^{-3}A^{-2}]$
(B) Electrical Potential	2. $[ML^2T^{-3}A^{-2}]$
(C) Specific Resistance	3. $[ML^2T^{-3}A^{-1}]$
(D) Specific Conductance	4. None

(a) A-2 , B-3 , C-1 , D-4
(b) A-2 , B-4 , C-3 , D-1
(c) A-1 , B-2 , C-4 , D-3
(d) A-1 , B-3 , C-2 , D-4

45. Statement-I Out of two measurements $l_1 = 0.7m$ & $l_2 = 1.00m$, the second one is more accurate.

Statement-II In every measurement, the last digit is not accurately known.

In the light of the above statements choose the most appropriate answer from the options given below

(a) Statement I is correct but II is incorrect
(b) Statement I is incorrect but II is correct
(c) Both statements I & II are correct
(d) Both statements I & II are incorrect

46. With usual notation, the following equation said to give the distance covered in the nth second, i.e. $Sn = u + a\left(\frac{2n-1}{2}\right)$ is

(a) only numerically correct
(b) only dimensionally correct
(c) Both dimensionally & numerically correct
(d) Neither numerically nor dimensionally correct

47. Assertion: Parallax method can't be used for measuring distances of stars more than 100 light years away.

Reason: Because parallax angle reduces so much that it can't be measured accurately.

(a) Both Assertion & Reason are correct, but reason is not the correct explanation of assertion.
(b) Assertion is false, but Reason is true.
(c) Assertion is true, but Reason is false.

(d) Both Assertion & Reason are correct, and Reason is the correct explanation of assertion.

48. Assertion: Dimensional formula of given quantity

$$\sqrt{\frac{Magnetic\ Dipole\ Moment \times Magnetic\ Induction}{Moment\ Of\ Inertia}} \text{ is}$$

$[M^0 L^0 T^{-1}]$

Reason: The given dimension is that of frequency.

(a) Both Assertion & Reason are correct, but reason is not the correct explanation of assertion.
(b) Assertion is false, but Reason is true.
(c) Assertion is true, but Reason is false.
(d) Both Assertion & Reason are correct, and Reason is the correct explanation of assertion.

49. Assertion: The error in the measurement of radius of the sphere is 0.3%. The permissible error in its surface area is 0.6%.

Reason: The permissible error is calculated by the formula $\frac{\Delta A}{A} = \frac{4\Delta r}{r}$

(a) Both Assertion & Reason are correct, but reason is not the correct explanation of assertion.
(b) Assertion is false, but Reason is true.
(c) Assertion is true, but Reason is false.
(d) Both Assertion & Reason are correct, and Reason is the correct explanation of assertion.

50. Which of the following statement is incorrect?

(a) Dimensional formula of thermal conductivity (K) is $M^1 L^1 T^{-3} K^{-1}$
(b) Dimensional formula of potential (V) is $M^{-1} L^2 T^{-3} A^{-1}$
(c) Dimensional formula of R.C is $M^0 L^0 T^1$
(d) Dimensional formula of permeability of free space (μ0) is $M^1 L^1 T^{-2} A^{-2}$