Yakeen NEET 2.0 (2026)

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KPP-12

Units and Dimensions

1. In a given system of units, 1 unit of mass = 2 kg, 1 unit of length = 5 m and 1 unit of time = 5 sec. Then in this system, 1 N represents:
(1) 5/2 units of force
(2) 2/5 units of force
(3) 2 units of force
(4) 1/2 units of force

2. Imagine a system of units in which the unit of mass is 10 kg, length is 1 km and time is 1 minute. Then 1 J in this system is equal to _____ units of work:
(1) 360 (2) 3.6
(3) 3.6×10^5 (4) 36×10^{-5}

3. In a new unit system, 1 unit of time is equal to 10 second, 1 unit of mass is 5 kg and 1 unit of length is 20 m. In the new system of units, 1 unit of energy is equal to:
(1) 20 Joule (2) $\frac{1}{20}$ Joule
(3) 4 Joule (4) 16 Joule

4. In a particular system of unit, if the unit of mass becomes twice and that of time becomes half, then 8 joules will be written as _____ units of work.
(1) 16 (2) 1
(3) 4 (4) 64

5. A calorie is a unit of heat or energy and it equals about 4.2 J, where 1 J = 1 kg m^2/s^2. Suppose we employ a system of units in which the unit of mass equals α kg, the unit of length equals β metre, the unit of time is γ second. Show that a calorie has a magnitude 4.2 $\alpha^{-1}\beta^{-2}\gamma^2$ in terms of the new units.

6. The pressure of 10^6 dyne/cm^2 is equivalent to
(1) 10^5 N/m^2 (2) 10^6 N/m^2
(3) 10^7 N/m^2 (4) 10^8 N/m^2

7. If in a system of measurements unit of mass is α kg, unit of length is β m and that of time is γ sec. Find the value of 100 joule in this system.
(1) 100 $\alpha^{-1}\beta^{-2}\gamma^2$ (2) 100 $\alpha^{-2}\beta^{-1}\gamma^{-2}$
(3) 100 $\alpha\beta^{-2}\gamma$ (4) 1000 $\alpha^{-2}\beta^2\gamma^{-1}$

8. If the unit of length is micrometer and the unit of time is microsecond, the unit of velocity will be:
(1) 100 m/s (2) 10 m/s
(3) 10^{-6} m/s (4) 1 m/s

9. In a certain system of units, unit of time is 5 s, unit of mass is 20 kg and unit of length is 10m. In this system, one unit of power will be equal to:
(1) 16 watts (2) 1/16 watts
(3) 25 watts (4) None of these

10. If the units of force and that of length are doubled, the unit of energy will become
(1) 1/4 times (2) 1/2 times
(3) 2 times (4) 4 times

11. If the units of mass and length are doubled then the unit of kinetic energy will become
(1) 2 times (2) 4 times
(3) 8 times (4) 16 times

12. Suppose two students are trying to make a new measurement system so that they can use it like a code measurement system and others do not understand it. Instead of taking 1 kg, 1 m and 1 s. as basic unit they took unit of mass as α kg, the unit of length as β m and unit of time as γ second. They called power in new system as SHAKTI, then match the two columns.

Column-I		Column-II	
A.	1N in new system	p.	$\alpha^{-1}\beta^{-2}\gamma^2$
B.	1J in new system	q.	$\alpha^{-1}\beta^{-1}\gamma^2$
C.	1 Pascal (SI unit of pressure) in new sys	r.	$\alpha^{-1}\beta\gamma^2$
D.	α SHAKTI in watt	s.	$\alpha^2\beta^2\gamma^{-3}$

(1) A-(q); B-(p); C-(r); D-(s)
(2) A-(p); B-(q); C-(r); D-(s)
(3) A-(q); B-(p); C-(s); D-(r)
(4) A-(p); B-(r); C-(q); D-(s)

13. The density of a material in SI units is 128 kg m^{-3}. In certain units in which the unit of length is 25 cm and the unit of mass 50 g, the numerical value of density of the material is:

[10 Jan, 2019 (Shift-I)]

(1) 40 (2) 16
(3) 640 (4) 410

14. What is the dimensional formula of ab^{-1} in the equation $\left(P+\frac{a}{V^2}\right)(V-b)=RT$, where letters have their usual meaning.

[05 April, 2024 (Shift-II)]

(1) $\left[M^0L^3T^{-2}\right]$
(2) $\left[ML^2T^{-2}\right]$
(3) $\left[M^{-1}L^5T^3\right]$
(4) $\left[M^6L^7T^4\right]$

15. The moment of inertia of a body rotating about a given axis is 12.0 kg m^2 in the SI system. What is the value of the moment of inertia in a system of units in which the unit of length is 5 cm and the unit of mass is 10 g?

(1) 2.4×10^3 (2) 6.0×10^3
(3) 5.4×10^5 (4) 4.8×10^5

16. The density of a material in CGS system of units is 4 g/cc. In a system of units in which unit of length is 2 cm and unit of mass is 16 g, find the numerical value of density of material.

17. In a new system of units, the unit of mass is 100 g, unit of length is 4 m and unit of time is 2 s. Find the numerical value of 10 J in this system.

18*. A block of mass 10kg is moving with acc. 10 m/s^2. Let at a given instant its speed is 20 m/s. Now in a hypothetical system at the given instant value of net force on particle is 100 unit of force and its kinetic energy is 20 unit of energy.
If a liquid has surface tension of 10. SI units find its surface tension in new system. **[SSSQ]**

Answer Key

1. (1)
2. (4)
3. (1)
4. (2)
5. 4.2 $\alpha^{-1}\beta^{-2}\gamma^{2}$
6. (1)
7. (1)
8. (4)
9. (1)
10. (4)
11. (3)
12. (1)
13. (1)
14. (2)
15. (4)
16. (2)
17. (25)
18. (1000)

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