BJNP

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Knowledge is Discipline

Learning with the Speed of Mumbai and the Tradition of Kota

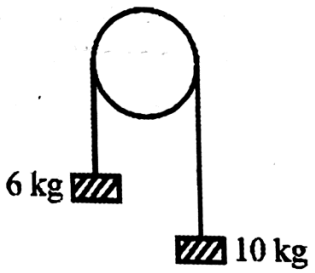
Max. Marks: 60 **Date: 16.10.2022**

NEET 24 BATCH (SET B)

PHYSICS : DCT

Topics: Laws of Motion and Friction

1. A light string passes over a frictionless pulley. To one of its ends a mass of 6 kg is attached and to its other end a mass of 10 kg is attached as shown in the figure below. The tension in the thread will be



(a) 24.5 N (b) 2.45 N (c) 79 N (d) 73.5 N

2. A block of mass M is pulled along a horizontal frictionless surface by a rope of mass m. Force P is applied at one end of the rope. The force which the rope exerts on the block is

(a) $\frac{P}{M(m+M)}$ (b) $\frac{P}{M-m}$ (c) $\frac{Pm}{M-m}$ (d) $\frac{PM}{m+M}$

3. A rectangular block is held against a rough vertical wall by applying a force of 200 N normal to the wall. If the frictional force just prevents the block from sliding down the wall, what is the mass of the block? (The coefficient of static friction between the block and the wall is 0.49).

(a) 5 kg (b) 7.5 kg (c) 10 kg (d) 15 kg

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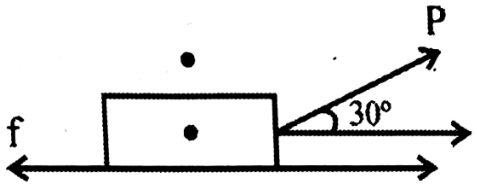
4. A body of weight W = mg slides down a rough vertical pole with an acceleration = $\frac{g}{4}$, where g is the acceleration due to gravity. What is the frictional force in terms of the weight of the body?

(a) $\frac{W}{4}$ (b) $\frac{W}{2}$ (c) $\frac{W}{3}$ (d) $\frac{3W}{4}$

5. A block placed on a rough horizontal surface is imparted a velocity of 10 m/s. The coefficient of kinetic friction between the block and the surface is 0.5 and g = 10 m/s^2. How much distance the block will over, before coming to rest?

(a) 5 m (b) 7.5 m (c) 12 m (d) 10 m

6. A body of mass m, kept on a rough horizontal surface, is pulled by a force P as shown in the figure. The coefficient of frictional between the body and the surface is μ. What is the limiting force of friction between the body and the surface?



(a) $\mu\left[mg + \frac{P}{2}\right]$ (b) $\mu\left[mg - \frac{P}{2}\right]$ (c) $\mu\left[mg - \frac{P}{2}\right]^{1/2}$ (d) $\mu\left[mg + \frac{P}{\sqrt{3}}\right]$

7. A ladder weighing 300 N is placed against a smooth vertical wall having a coefficient of friction of 0.2 between it and the floor. What is the maximum force of friction available at the point of contact between the ladder and the floor?

(a) 40 N (b) 50 N (c) 60 N (d) 70 N

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8. A 20 kg block is initially at rest. A 75 N force is required to set the block in motion. After the motion starts, a force of 60 N is required to keep the block moving with constant speed. The coefficient of static friction is

(a) 0.52 (b) 0.44 (c) 0.6 (d) 0.38

9. A block of mass 10 kg is placed on a rough horizontal surface having coefficient of static friction $\mu = 0.5$. If a horizontal force of 100 N is applied to it, then the acceleration of the block will be ($g = 10\ m/s^2$)

(a) $0.5\ m/s^2$ (b) $10\ m/s^2$ (c) $5\ m/s^2$ (d) $15\ m/s^2$

10. A block B is pushed momentarily along a horizontal surface with an initial velocity v. If μ is the coefficient of sliding friction between B and the surface, block B will come to rest after a time t equal to

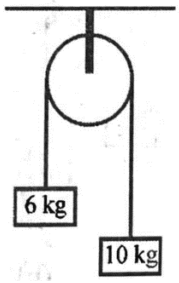
(a) $\frac{v}{g\mu}$ (b) $\frac{v}{g}$ (c) $\frac{g\mu}{v}$ (d) $\frac{g}{v}$

11. A triangular block of mass M with angles 30°, 60° and 90° rests with its 30° – 90° side on a horizontal table. A cubical block of mass m rests on the 60° – 30° side, which is assumed to be smooth. What acceleration should be given to the block of mass M, relative to the table, to keep m stationary relative to the triangular block?

(a) g (b) $\frac{g}{\sqrt{2}}$ (c) $\frac{g}{\sqrt{3}}$ (d) $\frac{g}{2}$

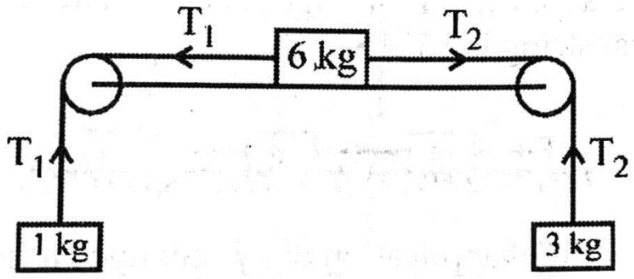
Space for Rough Work

12. A light string passes over a frictionless pulley. To one of its ends, a mass of 6 kg is attached. To its other end a mass of 10 kg is attached, as shown in the figure. What is the tension in the string? (Take g = 10 m/s^2)



(a) 25 N (b) 30 N (c) 50 N (d) 75 N

13. Three masses of 1 kg, 6 kg and 3 kg are connected to each other with strings and are placed on a table as shonw in the figure. What is the acceleration with which the system is moving? (Take g = 10 m/s^2)



(a) Zero (b) 1 m/s^2 (c) 2 m/s^2 (d) 3 m/s^2

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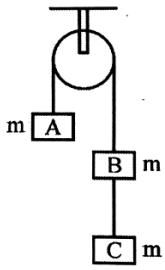
14. Three blocks A, B and C each of mass m are attached to a string, passing over a smooth pulley. What is the tension in the string connecting A and B?



(a) $\frac{2}{3}$ mg (b) mg (c) $\frac{4}{3}$ mg (d) $\frac{5}{3}$ mg

15. Two blocks of masses 2 kg and 4 kg are in close contact on a frictionless horizontal table. A horizontal force of 18 N is applied to the larger mass. What is the force at the surface of contact between the blocks?

(a) 4 N (b) 5 N (c) 6 N (d) 8 N

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NEET 24 (SET B)

CHEMISTRY : DCT

Topics: Atomic Structure, Mole Concept and Periodic

16. If the ionisation energy of hydrogen atom is 13.6 eV, the energy required to excite it from ground state to the next higher state is approximately

(a) 3.4 eV (b) 10.2 eV (c) 17.2 eV (d) 13.6 eV

17. Sodium ion is isoelectronic with

(a) Mg^{2+} (b) Al^{3+} (c) N^{-3} (d) All

18. The wavelength of a microscopic particle of mass 9.1×10^{-31} kg is 182 nm, its kinetic energy in J is

($h = 6.625 \times 10^{-34}$ Js)

(a) 7.28×10^{-23} (b) 7.28×10^{-24} (c) 3.64×10^{-23} (d) 3.64×10^{-24}

19. O_2^{2-} is the symbol of .....ion.

(a) Oxide (b) Super (c) Peroxide (d) Monoxide

20. Statement I : $NaNO_3$ has no definite molecule.

Statement II : Its formula mass is 85.

(a) If Statement I is true, Statement II is true, Statement II is the correct explanation of statement I.

(b) If Statement I is true, Statement II is true, Statement II is not the correct explanation for Statement I.

(c) Statement I is true but statement II is false.

(d) Statement I is false but statement II is true.

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21. Which of the following is a compound

(a) Diamond (b) Salt + H_2O (c) Washing sode (d) Ca

22. Physical state of water at 273 K is

(a) Solid (b) Liquid (c) Gas (d) Both a and b

23. The outer most orbit of an element X is partially filled with electrons in 's' and 'p' subshells. The element is

(a) An inert gas (b) A representative element

(c) A transition element (d) An inner transition element

24. A member of Lanthanide

(a) Caesium (b) Lanthanum (c) Neoybium (d) Lutetium

25. Match the following.

	Type I Series		Type II Elements
A.	3d	1.	Sc (21) to Zn (30)
B.	4d	2.	La (57), Hf (72) to Hg (80)
C.	5d	3.	Y (39) to Cd (48)
D.	6d	4.	Ac (89), Rf (104) to Mt (109)

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

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

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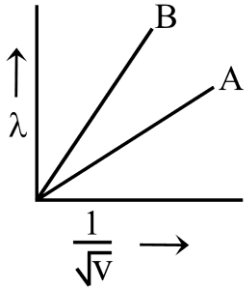
26. de Broglie wavelength of two particles A and B are plotted against $\left(\frac{1}{\sqrt{V}}\right)$: where V is the applied potential on the particles. Which of the following relations is correct about the mass of the particles?



(a) $m_A = m_B$ (b) $m_A > m_B$ (c) $m_A < m_B$ (d) $m_A \leq m_B$

27. Which one of the following is an isobar of ${}_6C^{14}$?

(a) ${}_6C^{13}$ (b) ${}_6C^{12}$ (c) ${}_7N^{14}$ (d) ${}_7N^{15}$

28. The shape of atomic orbitals is given by

(a) Principal quantum number (b) Subsidiary quantum number

(c) Magnetic quantum number (d) Spin quantum number

29. Which has the same number of s-electrons as the d-electrons in Fe^{2+}?

(a) Li (b) Na (c) N (d) P

30. The energy absorbed by each molecule (A_2) of a substance is 4.4×10^{-9} J and bond energy per molecule is 4.0×10^{-19} J. The kinetic energy per atom will be

(a) 2.0×10^{-20} J (b) 2.2×10^{-10} J (c) 2.0×10^{-19} J (d) 4.0×10^{-20} J

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PHYSICS : DCT SET – B ANSWER KEY
Topics: Laws of Motion and Friction

1.	(a)	2.	(b)	3.	(c)	4.	(d)	5.	(c)
6.	(a)	7.	(c)	8.	(b)	9.	(a)	10.	(c)
11.	(d)	12.	(c)	13.	(d)	14.	(c)	15.	(d)

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CHEMISTRY : DCT SET – B ANSWER KEY
Topics: Atomic Structure, Mole Concept and Periodic

16.	(a)	17.	(d)	18.	(b)	19.	(c)	20.	(c)
21.	(c)	22.	(d)	23.	(b)	24.	(d)	25.	(a)
26.	(b)	27.	(c)	28.	(b)	29.	(d)	30.	(a)