

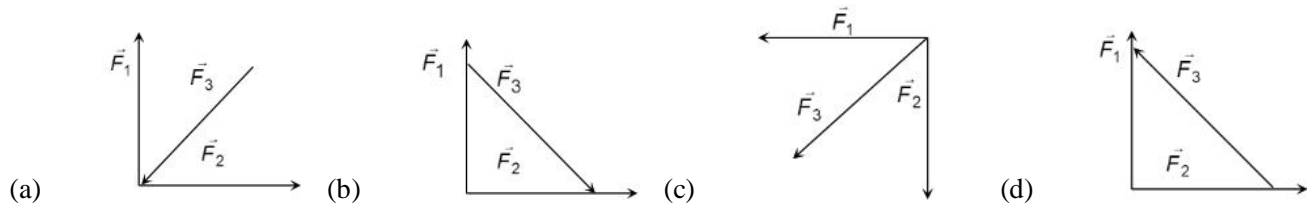


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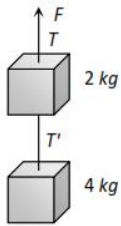
Date: 29.08.2022

JB 2 MR BATCH
PHYSICS : PART TEST
Topic: Relative Motion & NLM

1. Which of the four arrangements in the figure correctly shows the vector addition of two forces \vec{F}_1 and \vec{F}_2 to yield the third force \vec{F}_3 ?



2. Two blocks are connected by a string as shown in the diagram. The upper block is hung by another string. A force F applied on the upper string produces an acceleration of 2m/s^2 in the upward direction in both the blocks. If T and T' be the tensions in the two parts of the string, then

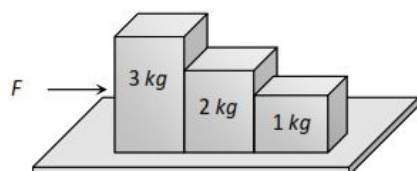


- | | |
|--|--|
| (a) $T = 70.8 \text{ N}$ and $T' = 47.2 \text{ N}$ | (b) $T = 58.8 \text{ N}$ and $T' = 47.2 \text{ N}$ |
| (c) $T = 70.8 \text{ N}$ and $T' = 58.8 \text{ N}$ | (d) $T = 70.8 \text{ N}$ and $T' = 0$ |

Space for Rough Work



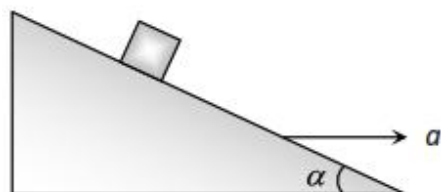
3. Consider the following statements about the blocks shown in the diagram that are being pushed by a constant force on a frictionless table



- A. All blocks move with the same acceleration
 B. The net force on each block is the same

Which of these statements are/is correct?

- (a) A only (b) B only (c) Both A and B (d) Neither A nor B
4. A block is kept on a frictionless inclined surface with angle of inclination ' α '. The incline is given an acceleration ' a ' to keep the block stationary. Then a is equal to

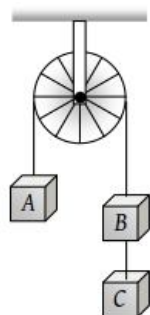


- (a) g (b) $g \tan \alpha$ (c) $g / \tan \alpha$ (d) $g \operatorname{cosec} \alpha$

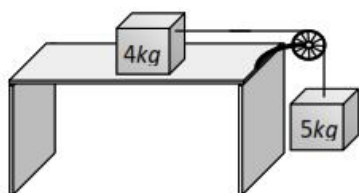
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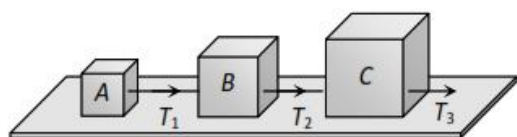
5. Three equal weights A, B and C of mass 2 kg each are hanging on a string passing over a fixed frictionless pulley as shown in the figure. The tension in the string connecting weights B and C is



- (a) Zero (b) 13 N (c) 3.3 N (d) 19.6 N
6. Two masses of 4 kg and 5 kg are connected by a string passing through a frictionless pulley and are kept on a frictionless table as shown in the figure. The acceleration of 5 kg mass is



- (a) 49 m/s^2 (b) 5.44 m/s^2 (c) 19.5 m/s^2 (d) 2.72 m/s^2
7. Three blocks A, B and C weighing 1, 8 and 27 kg respectively are connected as shown in the figure with an inextensible string and are moving on a smooth surface. T_3 is equal to 36 N. Then T_2 is

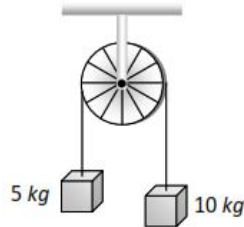


- (a) 18 N (b) 9 N (c) 3.375 N (d) 1.25 N

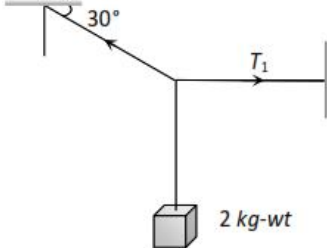
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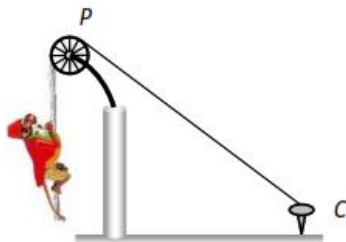
8. USS 150) Two masses of 5kg and 10kg are connected to a pulley as shown. What will be the acceleration of the system (g = acceleration due to gravity)



- (a) g (b) $\frac{g}{2}$ (c) $\frac{g}{3}$ (d) $\frac{g}{4}$
9. A body of weight 2 kg is suspended as shown in the figure. The tension T_1 in the horizontal string (in kg wt) is



- (a) $2/\sqrt{3}$ (b) $\sqrt{3}/2$ (c) $2\sqrt{3}$ (d) 2
10. One end of a massless rope, which passes over a massless and frictionless pulley P is tied to a hook C while the other end is free. Maximum tension that the rope can bear is 360 N. with what value of minimum safe acceleration (in ms^{-2}) can a monkey of 60 kg move down on the rope



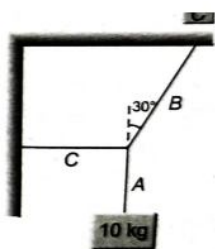
- (a) 16 (b) 6 (c) 4 (d) 8

Space for Rough Work



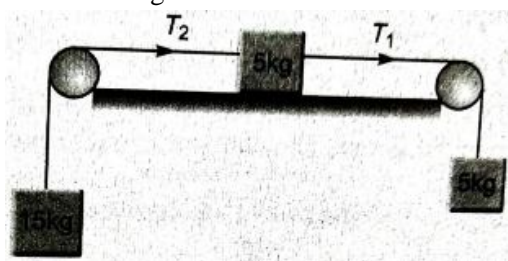
11. Two balls A and B of same size are dropped from the same point under gravity. The mass of A is greater than that of B. If the air resistance acting on each ball is same, then
- (a) both the balls reach the ground simultaneously (b) the ball A reaches earlier
 (c) the ball B reaches earlier (d) nothing can be said

12. In a figure a block of mass 10 kg is in equilibrium. Identify the string in which the tension is zero.



- (a) B (b) C (c) A (d) None of the above
13. A force F_1 accelerates a particle from rest to a velocity v . Another force F_2 decelerates the same particle from v to rest, then
- (a) F_1 is always equal to F_2
 (b) F_2 is greater than F_1
 (c) F_2 may be smaller than, greater than or equal to F_1
 (d) F_2 cannot be equal to F_1

14. In the figure shown, the frictional coefficient between table and block is 0.2. Find the ratio of tensions in the right and left strings.

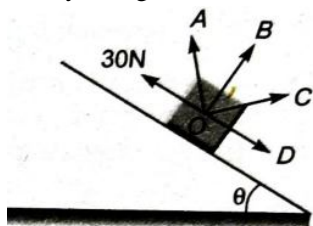


- (a) 17 : 24 (b) 34 : 12 (c) 2 : 3 (d) 3 : 2

Space for Rough Work



15. A body of mass 10 kg lies on a rough inclined plane of inclination $\theta = \sin^{-1}\left(\frac{3}{5}\right)$ with the horizontal. When the force of 30 N is applied on the block parallel to and upward the plane, the total force by the plane on the block is nearly along

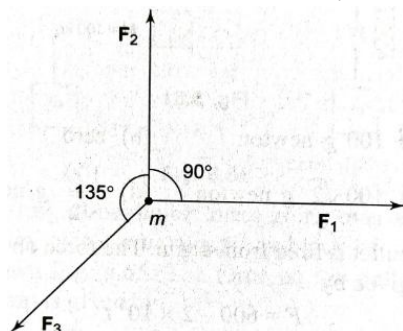


- (a) OA (b) OB (c) OC (d) OD
16. A body takes time t to reach the bottom of a smooth inclined plane of angle θ with the horizontal. If the plane is made rough, time taken now is $2t$. The coefficient of friction of the rough surface is
- (a) $\frac{3}{4} \tan \theta$ (b) $\frac{2}{3} \tan \theta$ (c) $\frac{1}{4} \tan \theta$ (d) $\frac{1}{2} \tan \theta$
17. In order to raise a mass m a man ties it to a rope and passes the rope over a frictionless pulley. He climbs the rope with an acceleration $3g/2$ relative to the rope. If the mass of the man is $m/2$ and the mass of the rope is negligible, the tension in the rope is
- (a) $\frac{3mg}{2}$ (b) $\frac{5mg}{3}$ (c) $\frac{7mg}{6}$ (d) $\frac{9mg}{7}$
18. A block A is released from the top of smooth inclined plane and slides down the plane. Another block B is dropped from the same point and falls vertically downwards. Which one of the following statements will be true if the friction offered by air is negligible?
- (a) Both blocks will reach the ground at the same time.
 (b) Block A reaches the ground earlier than block B.
 (c) Both blocks will reach the ground with the same speed.
 (d) Block B reaches the ground with a higher speed than block A.

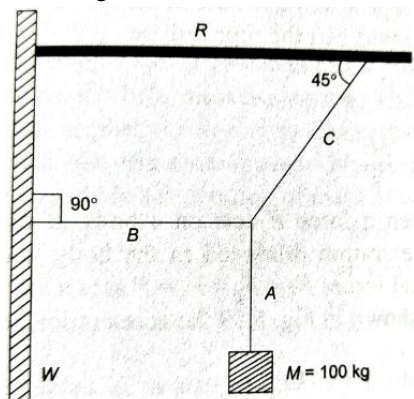
Space for Rough Work



19. When a force F acts on a body of mass m , the acceleration produced in the body is a . If three equal forces $F_1 = F_2 = F_3 = F$ act on the same body as shown in Fig 5.59 the acceleration produced is



- (a) $(\sqrt{2} - 1)a$ (b) $(\sqrt{2} + 1)a$ (c) $\sqrt{2}a$ (d) a
20. A mass $M = 100 \text{ kg}$ is suspended with the use of strings A, B and C as shown in fig. 5.61 W is a vertical wall and R is a rigid horizontal rod. The tension in string B is



- (a) 100 g newton (b) zero (c) $100 \sqrt{2} \text{ g newton}$ (d) $\frac{100}{\sqrt{2}} \text{ g newton}$
21. A swimmer can swim in still water with a speed of 5 ms^{-1} . While crossing a river his average speed is 3 ms^{-1} . If he crosses the river in the shortest possible time, what is the speed of flow of water?
- (a) 2 ms^{-1} (b) 4 ms^{-1} (c) 6 ms^{-1} (d) 8 ms^{-1}

Space for Rough Work



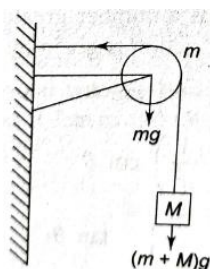
22. A boy wants to climb down a rope. The rope can withstand a maximum tension equal to two-thirds the weight of the boy. If g is the acceleration due to gravity, the minimum acceleration with which the boy should climb down the rope should be

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

23. Rain is falling vertically with a speed of 4 ms^{-1} . After some time, wind starts blowing with a speed of 3 ms^{-1} in the north to south direction. In order to protect himself from rain, a man standing on the ground should hold his umbrella at an angle θ given by

(a) $\theta = \tan^{-1}\left(\frac{3}{4}\right)$ with the vertical towards south (b) $\theta = \tan^{-1}\left(\frac{3}{4}\right)$ with the vertical towards north
 (c) $\theta = \cot^{-1}\left(\frac{3}{4}\right)$ with the vertical towards south (d) $\theta = \cot^{-1}\left(\frac{3}{4}\right)$ with the vertical towards north

24. A string of negligible mass going over a clamped pulley of mass m supports a block of mass M as shown Fig. 5.65. The force on the pulley by the clamp is given by



(a) $\sqrt{2}Mg$ (b) $\sqrt{2}mg$ (c) $\sqrt{(M+m)^2 + m^2}g$ (d) $\sqrt{(M+m)^2 + M^2}g$

25. Water is flowing in a river of width 36 m with a speed of 2 ms^{-1} . A person in a boat at a point P on the bank of the river wants to cross the river by the shortest path to reach a point Q directly opposite on the other bank. If he can row his boat with a speed of 4 ms^{-1} in still water, he should row his boat at an angle of

(a) 30° upstream with the line PQ (b) 30° downstream with the line PQ
 (c) $\tan^{-1}(0.5)$ upstream with the line PQ (d) $\tan^{-1}(2)$ downstream with the line PQ

Space for Rough Work



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JB 2 MR BATCH
CHEMISTRY: PART TEST
Topic: Periodic Properties + Mole Concept

26. An organic compound contains 49.3% carbon, 6.84 % hydrogen and its vapour density is 73. Molecular formula of the compound is
(a) $C_3H_8O_2$ (b) $C_3H_{10}O_2$ (c) C_6H_9O (d) $C_6H_{10}O_4$
27. Two oxides of a metal contain 50% and 40% of metal M respectively. If the formula of first oxide is MO, the formula of 2nd oxide will be
(a) MO_2 (b) M_2O_3 (c) M_2O (d) M_2O_5
28. The mass of carbon anode consumed (giving only carbon dioxide) in the production of 270 kg of Al metal from bauxite by Hall process is :
(a) 270 kg (b) 540 kg (c) 90 kg (d) 180 kg
29. Sulphur trioxide is prepared by the following two reactions.
 $S_8(s) + 8O_2(g) \rightarrow 8SO_2(g)$
 $2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$
How many grams of SO_3 are produced from 1 mole S_8 ?
(a) 1280 (b) 640 (c) 960 (d) 320
30. Which pair of the following substances is said to be isomorphous?
(a) White vitriol and blue vitriol (b) Epsom salt and Glauber's salt
(c) Blue vitriol and Glauber's salt (d) White vitriol and Epsom salt.
31. The total number of protons in 10g of calcium carbonate is :
(a) 3.0115×10^{24} (b) 1.5057×10^{24} (c) 2.0478×10^{24} (d) 4.0956×10^{24}

Space for Rough Work

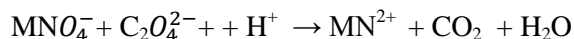


32. Total number of atoms represented by the compound $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ is :
 (a) 27 (b) 21 (c) 5 (d) 8
33. The equivalent weight of phosphoric acid H_3PO_4 in the reaction.
 $\text{NaOH} + \text{H}_3\text{PO}_4 \rightarrow \text{NaH}_2\text{PO}_4 + \text{H}_2\text{O}$ is :
 (a) 59 (b) 49 (c) 25 (d) 98
34. Which of the following has least oxidation state of Fe?
 (a) $\text{K}_3[\text{Fe}(\text{OH})_6]$ (b) $\text{K}_2[\text{FeO}_4]$
 (c) $\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$ (d) $[\text{Fe}(\text{CN})_6]^{3-}$
35. Oxidation state of carbon in HCOOH will be :
 (a) +1 (b) +2 (c) -4 (d) 0
36. Which one of the following reactions is a redox reaction ?
 (a) $\text{CuSO}_4 + 4\text{NH}_3 \rightarrow [\text{Cu}(\text{NH}_3)_4]\text{SO}_4$ (b) $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$
 (c) $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_3$ (d) $2\text{CuSO}_4 + 4\text{KI} \rightarrow \text{Cu}_2\text{I}_2 + 2\text{K}_2\text{SO}_4 + \text{I}_2$
37. In the reaction, $2\text{Na}_2\text{S}_2\text{O}_3 + \text{I}_2 = \text{Na}_2\text{S}_4\text{O}_6 + 2\text{NaI}$, I_2 acts as :
 (a) reducing agent (b) oxidising agent
 (c) oxidising as well as reducing agent (d) none
38. In the following reaction
 $3\text{Br}_2 + 6\text{CO}_3^{2-} + 3\text{H}_2\text{O} = 5\text{Br}^- + \text{BrO}_3^- + 6\text{HCO}_3^-$
 (a) bromine is oxidised, carbonate is reduced. (b) bromine is reduced, carbonate is oxidised
 (c) bromine is neither reduced nor oxidised (d) bromine is reduced as well as oxidised
39. In which the following reactions no change in valency occurs?
 (a) $\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow 3\text{S} + 2\text{H}_2\text{O}$ (b) $2\text{Na} + \text{O}_2 \rightarrow \text{Na}_2\text{O}_2$
 (c) $\text{Cl}_2 + 2\text{NaOH} \rightarrow \text{NaClO} + \text{NaCl} + \text{H}_2\text{O}$ (d) $\text{AgNO}_3 + \text{KCl} \rightarrow \text{AgCl} + \text{KNO}_3$

Space for Rough Work



40. For the redox reaction,



the correct coefficients of the reactants for the balanced equation are :

| | MnO_4^- | $\text{C}_2\text{O}_4^{2-}$ | H^+ |
|-----|------------------|-----------------------------|--------------|
| (a) | 2 | 5 | 16 |
| (b) | 16 | 5 | 2 |
| (c) | 5 | 16 | 2 |
| (d) | 2 | 16 | 5 |

41. The oxidation state of iodine in H_4IO_6^- is :

- (a) +7 (b) -1 (c) +5 (d) +1

42. A compound contains atoms A, B and C. The oxidation number of A is +2, of B is +5 and of C is -2. The possible formula of the compound is :

- (a) ABC_2 (b) $\text{B}_2(\text{AC}_3)_2$ (c) $\text{A}_3(\text{BC}_4)_2$ (d) $\text{A}_3(\text{B}_4\text{C})_2$

43. All the s-block elements of the periodic table are placed in the groups

- (a) IA and IIA (b) IIIA and IV A (c) Bgroups (d) VA and VII A

44. The set representing the correct order of first ionisation potential is

- (a) $\text{K} > \text{Na} > \text{Li}$ (b) $\text{Be} > \text{Mg} > \text{Ca}$ (c) $\text{B} > \text{C} > \text{N}$ (d) $\text{Ge} > \text{Si} > \text{C}$

45. The correct order of radii is

- (a) $\text{N} < \text{Be} < \text{B}$ (b) $\text{F}^- < \text{O}^{2-} < \text{N}^{3-}$ (c) $\text{Na} < \text{Li} < \text{K}$ (d) $\text{Fe}^{3+} < \text{Fe}^{2+} < \text{Fe}^{4+}$

46. The ionisation enthalpy of X^+ ion is equal to

- (a) the electron gain enthalpy of X atom (b) the electronegativity of X atom
(c) the ionisation enthalpy of X atom (d) none of the above

Space for Rough Work



BJNP

Learning with the Speed of Mumbai and the Tradition of Kota



47. The first ionisation energy of oxygen is less than that of nitrogen. Which of the following is the correct reason for this observation?
- (a) lesser effective nuclear charge of oxygen than nitrogen
 - (b) lesser atomic size of oxygen than nitrogen.
 - (c) Greater inter-electron repulsion between two electrons in the same p-orbital counter balances the increase in effective nuclear charge on moving from nitrogen to oxygen .
 - (d) Greater effective nuclear charge of oxygen than nitrogen.
48. Identify the wrong statement in the following:
- (a) Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius.
 - (b) Amongst isoelectronic species, greater the negative charge on the anion, larger is the ionic radius.
 - (c) Atomic radius of the elements increases as one moves down the first group of the periodic table.
 - (d) Atomic radius of the elements decreases as one moves across from left to right in the 2nd period of the periodic table.
49. Which of the following is correct?
- | | |
|--|--|
| (a) Radius of $\text{Ca}^{2+} < \text{Cl} < \text{S}^{2-}$ | (b) Radius of $\text{Cl}^- < \text{S}^{2-} < \text{Ca}^{2+}$ |
| (c) Radius of $\text{S}^{2-} = \text{Cl}^- = \text{Ca}^{2+}$ | (d) Radius of $\text{S}^{2-} < \text{Cl}^- < \text{Ca}^{2+}$ |
50. The correct order of electronegativities of N, O, F and P is
- | | | | |
|---|---|---|---|
| (a) $\text{F} > \text{N} > \text{P} > \text{O}$ | (b) $\text{F} > \text{O} > \text{P} > \text{N}$ | (c) $\text{F} > \text{O} > \text{N} > \text{P}$ | (d) $\text{N} > \text{O} > \text{F} > \text{P}$ |
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JB 2 MR BATCH
PHYSICS : PART TEST ANSWER KEY
Topic: Relative Motion & NLM

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1. | (c) | 2. | (a) | 3. | (a) | 4. | (b) | 5. | (b) |
| 6. | (b) | 7. | (b) | 8. | (c) | 9. | (c) | 10. | (c) |
| 11. | (b) | 12. | (d) | 13. | (c) | 14. | (a) | 15. | (a) |
| 16. | (a) | 17. | (c) | 18. | (c) | 19. | (a) | 20. | (a) |
| 21. | (b) | 22. | (a) | 23. | (b) | 24. | (d) | 25. | (a) |

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JB 2 MR BATCH
CHEMISTRY: PART TEST ANSWER KEY
Topic: Periodic Properties + Mole Concept

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 26. | (d) | 27. | (b) | 28. | (c) | 29. | (b) | 30. | (d) |
| 31. | (a) | 32. | (b) | 33. | (d) | 34. | (c) | 35. | (b) |
| 36. | (d) | 37. | (b) | 38. | (d) | 39. | (d) | 40. | (a) |
| 41. | (a) | 42. | (c) | 43. | (a) | 44. | (b) | 45. | (b) |
| 46. | (d) | 47. | (c) | 48. | (a) | 49. | (a) | 50. | (c) |