

Max. Marks: 100

Date: 17.10.2022

JB 2 MR BATCH (SET B) PHYSICS : PART TEST Topic: Work Energy Power

- 1. A force acts on a 30 gm particle in such a way that the position of the particle as a function of time is given by $x = 3t 4t^2 + t^3$, where x is in metres and t is in seconds. The work done during the first 4 seconds is
 - (a) 5.28 J (b) 450 mJ (c) 490 mJ (d) 530 mJ
- 2. A block is released from rest from a height h = 5 m. After travelling through the smooth curved surface it moves on the rough horizontal surface through a length l = 8 m and climbs onto the other smooth curved surface through a height h'. If $\mu = 0.5$, find h'.





3. A block of mass m sliding down an incline at constant speed is initially at a height h above the ground, as shown in the figure above. The coefficient of kinetic friction between the mass and the incline is μ. If the mass continues to slide down the incline at a constant speed, how much energy is displaced by friction by the time the mass reaches the bottom of the incline?



- (a) mgh/ θ (b) mgh (c) μ mgh/sin θ (d) mgh/sin θ
- 4. A ring of mass m can slide over a smooth vertical rod as shown in figure. The ring is connected to a spring of force constant k = 4 mg/R, where 2R is the natural length of the spring. The other end of spring is fixed to the ground at a horizontal distance 2R from the base of the rod. If the mass is released at a height 1.5 R, then the velocity of the ring as it reaches the ground is



- 5. An 800 N marine in basic training climbs a 12.0 m vertical rope at a constant speed in 8.00 s. What is his power output?
 - (a) 1.8 kW (b) 1.2 kW (c) 2.2 kW (d) 2.8 kW



6.

Power supplied to a particle of mass 2 kg varies with time as $P = \frac{3t^2}{2}$ watt. Here t is in second. If velocity of

particle at t = 0 is v = 0, the velocity of particle at time t = 2 s will be: $2\sqrt{2}$ m/s (d) (a) 1 m/s(b) 4 m/s(c) 2 m/sA 30 m deep well is having water upto 15 m. An engine evacuates it in one hour. The power of the engine, if the 7. diameter of the well is 4 m is 1155 kW 2310 kW (a) 11.55 kW (b) (c) 23.10 kW (d) Work done when a force $F = (\hat{i} + 2\hat{j} + 3k) N$ acting on a particle takes it from the point $r_1 = (\hat{i} + \hat{j} + k)$ to the 8. point $r_2 = (\hat{i} - \hat{j} + 2k)$ is – 3 J (a) (b) - 1 J (c) (d) 2 J zero A particle moves along the x-axis from x = 0 to x = 5 m under the influence of a force given by $F = 7 - 2x + 3x^2$. 9. The work in the process is (a) 360 J (b) 85 J (c) 185 J (d) 135 J

10. A body with mass 1 kg moves in one direction in the presence of a force which is described by the potential energy graph. If the body is released from rest at x = 2 m, than its speed when it crosses x = 5 m is (Neglect dissipative forces)





- 11. A body has kinetic energy E when projected at angle of projection for maximum range. Its kinetic energy at the highest point of its path will be
 - (a) E (b) $\frac{E}{2}$ (c) $\frac{E}{\sqrt{2}}$ (d) zero
- 12. A projectile is fired from the origin with a velocity v_0 at an angle θ with the x-axis. The speed of the projectile at an altitude h is
 - (a) $v_0 \cos \theta$ (b) $\sqrt{v_0^2 2gh}$ (c) $\sqrt{v_0^2 \sin^2 \theta 2gh}$ (d) None of these
- 13. A spring of force constant k is cut in two parts at its one-third length. When both the parts are stretched by same amount. The work done in the two parts will be
 - (a) equal in both (b) greater for the longer part
 - (c) greater for the shorter part (d) data insufficient
- 14. A block of mass m is directly pulled up slowly on a smooth inclined plane of height h and inclination θ with the help of a string parallel to the incline. Which of the following statement is incorrect for the block when it moves up from the bottom to the top of the incline?



- (a) Work done by the normal reaction force is zero (b) Work done by the string is mgh
- (c) Work done by gravity is mgh (d) Net work done on the block is zero



- 15. A block of mass 10 kg is moving in x-direction with a constant speed of 10 m/s. It is subjected to a retarding force F = -0.1 x J/m during its travel from x = 20 m to x = 30 m. Its final kinetic energy will be
 - (a) 475 J (b) 450 J (c) 275 J (d) 250 J
- 16. A box of mass 25 kg starts from rest and slides down an inclined plane 8 metre long and 5 metre high. It is found to move at the bottom at 7 m/s. What is the force of friction?
 - (a) 79.6 N (b) 96.6 N (c) 76.6 N (d) 116.6 N
- 17. Given that the position of the body in m is a function of time as follows: $x = 2t^4 + 5t + 4$

The mass of the body is 2 kg. What is the increase in its kinetic energy one second after the start of motion?

- (a) 168 J (b) 169 J (c) 32 J (d) 144 J
- 18. Which of the following graphs is correct between kinetic energy (E), potential energy (U) and height (h) from the ground of the particle





19. Two identical balls A and B are released from the positions shown in figure. They collide elasticity on horizontal position MN. The ratio of the heights attained by A and B after collision will be (neglect friction):



- 20. A worker pushes a wheelbarrow with a horizontal force of 50 N on level ground over a distance of 5.0 m. If a friction force of 43 N acts on the wheelbarrow in a direction opposite that of the worker, what work is done on the wheelbarrow by the worker?
 - (a) 250 J (b) 215 J (c) 35 J (d) 10 J
- 21. A body is acted upon by a force which is proportional to the distance covered. If distance covered by denoted by x, then work done by the force will be proportional to:
 - (a) x (b) x^2 (c) $x^{3/2}$ (d) None of these
- 22. A force of $\vec{F} = 2x\hat{i} + 2\hat{j} + 3z^2k$ N is acting on particle. Find the work done by this force in displacing the body from (1, 2, 3) m to (3, 6, 1) m.
 - (a) -10 J (b) 100 J (c) 10 J (d) 1 J
- 23. The work done in moving a body of mass 4 kg with uniform velocity of 5 ms⁻¹ for 10 seconds on a surface of $\mu = 0.4$ is (take g = 9.8 m/s²)
 - (a) 584 J (b) 784 J (c) 684 J (d) 484 J



24. A body of mass 6 kg is under a force which causes displacement in it given by $S = \frac{t^2}{4}$ metres where t is time. The work done by the force in 2 seconds is (a) 12 J (b) 9 J (c) 6 J (d) 3 J 25. If the net work done by external forces on a particle is zero, which of the following statements about the particle.

25. If the net work done by external forces on a particle is zero, which of the following statements about the particle must be true?

- (a) Its velocity is zero (b) Its velocity is decreased
- (c) Its velocity is unchanged (d) Its speed is unchanged





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JB 2 MR BATCH CHEMISTRY : PART TEST SET - B Topic: Atomic Structure + Mole Concept + Periodic

				Space for	or Rough Wo	ork					
	(a)	5, 3	(b)	3,5	(c)	3, 4	(d)	4, 3			
33.	Write	the values of n	and l quanti	um numbers for	5f						
	(c)	Number of el	ectrons		(d)	Chemical prop	perties				
	(a)	Atomic numb	ber		(b)	Mass number					
32.	The i	sotopes of atoms	s of an elem	ent differ in							
	(d)	(d) the velocity of the electron undergoing the transition									
	(c)	c) the difference in the energy of the energy levels involved in the transition									
	(b)	the nuclear charge of the atom									
	(a)	the number of electrons undergoing the transition									
31.	The wavelength of a spectral line for an electronic transition is inversely related to										
	(a)	1:9	(b)	9:1	(c)	70%	(d)	80%			
30.	Neon isotoj	has two isotope bes is	es Ne ²⁰ and I	Ne ²² . If atomic v	weight of Neo	n is 20.2, the rati	o of the rela	tive abundances of the			
	(a)	0.34 g	(b)	3.4 g	(c)	3.4 kg	(d)	34 g			
29.	The r	nass of 1.205×10^{-1}	10 ²² molecu	les of ammonia	is						
	(c)	2.20 eV			(d)	No electrons will be emitted					
28.	A pro- the er (a)	nitted photo electric $4.4 \times 10^{-20} \text{J}$	ctron is	strikes a metal	(b)	0.425 eV					
20											
	(a)	neutron and r	neutrino		(b) (d)	neutron and el	ectron				
27.	The r	nass of an atom	is constitute	d mainly by							
	is pre	sent?	(b)	second	(c)	third	(d)	fourth			
26.	The p	The potential energy of an electron in the hydrogen atom is -6.8 eV. Indicate in which excited state, the electron									



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B) 107

C) 109

D) 110

(a)

Q) Uns

R) Unp

S) Une

A-R;B-Q;C-S;D-P (b)

34.	Identif (a) (b) (c) (d)	 Identify the correct statement regarding photoelectric effect. (a) K.E of emitted electron is independent on the frequency of incident photon (b) Number of photo electrons emitted is directly proportional to the intensity of incident light (c) The K.E of an emitted electron is greater than zero if incident energy is less than threshold energy of the metal (d) All 								
35.	The su (a)	3d	naving mini (b)	mum ene 5p	ergy 1s	(c)	4s	(d)	4p	
36.	Among	g the elements v	with the foll	owing el	ectronic cor	figuratio	ns, the one with the l	argest ra	dius is	
	(a)	$[Ne]3s^2$	(b)	[Ne]3s	s ² 3p ¹	(c)	$[Ne]3s^23p^3$	(d)	$[Ne]3s^23p^5$	
37.	The ion (a) (c)	 (a) [Ne]3s² (b) [Ne The ionization potential values of an ele (a) Alkali metal (c) Halogen 		an eleme	ent are in th	e followii (b) (d)	ng order $I_1 < I_2 <<<<$ Chalcogen Alkaline earth met	< I ₃ < I ₄ < tal	I ₅ . The element is	
38.	The I ₁ , formul (a)	, I ₂ , I ₃ and I ₄ va a of its sulphate MSO ₄	llues of an e e is (b)	element 1 M ₂ (SC	M are 120 I	cJ/mole, 6 (c)	500 kJ/mole, 1000 k M ₂ SO ₄	J/mole a (d)	nd 8000 kJ/mole. The M ₃ (SO ₄) ₂	
39.	The lP	$_1$ of O, S, F and	Cl are in th	e order						
	(a)	F > O > Cl > S	S (b) $S > Cl$		> O > F	(c)	Cl > S > O > F	(d)	F > Cl > O > S	
40.										
	List-I (atomic number of element) A) 105		List-II (IUPAC name) P) Uun							

A-R;B-S;C-Q;D-P (c)

Space for Rough Work

A-Q;B-S;C-R;D-P (d)

A-S;B-R;C-Q;D-P



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41.	41. The oxide of an element possesses the formula MO ₂ . If the equivalent mass of the metal is 9, the of the metal will be							then the atomic mass		
	(a)	9	(b)	18	(c)	27	(d)	36		
42.	A compound possesses 8% sulphur by mass. The least molecular mass is?									
	(a)	200	(b)	400	(c)	155	(d)	355		
43.	Boron period	has two stable isot ic table is	opes, ¹⁰ I	B (19%) and ¹¹ B (81	%). The	atomic mass that sh	ould app	pear for boron in the		
	(a)	10.8	(b)	10.2	(c)	11.2	(d)	10.0		
44.	The sp	ecific heat of metal	is 0.16.	Its approximate atom	ic weigh	t would be				
	(a)	40	(b)	16	(c)	32	(d)	64		
45.	Which	among the following	ng group	of elements are smal	lest in si	ze?				
	(a)	I A group	(b)	II A group	(c)	VII A group	(d)	VI A group		
46.	Which	of the following is	electron	ic configuration of Cu	$u^{2+}(Z = 1)$	29)?				
	(a)	$[Ar]4s^{1}3d^{8}$	(b)	$[Ar]4s^23d^{10}4p^1$	(c)	$[Ar]4s^{1}3d^{10}$	(d)	[Ar]3d ⁹		
47.	For giv	ven energy, $E = 3.03$	$3 imes 10^{-19}$	Joules corresponding	g wavele	ngth is (h = 6.626×1	0 ⁻³⁴ J se	c, c = 3×10^8 m/sec)		
	(a)	65.6 nm	(b)	6.56 nm	(c)	3.4 nm	(d)	656 nm		
48.	The m	agnetic quantum nu	mber foi	the outermost electro	on in soc	lium atom is				
	(a)	-2	(b)	0	(c)	+1	(d)	-1		
49.	What v	will be the mass of a	particle	e if uncertainty in its p	osition	is 10^{-8} m and velocity	is 5.26	$\times 10^{-25} \text{ ms}^{-1}$		
	(a)	0.01 kg	(b)	0.1 kg	(c)	1 kg	(d)	10 kg		
50.	The nitrogen atom has 7 protons and 7 electrons, the nitride ion (N ³⁻) will have									
	(a)	7 protons and 10 e	electrons		(b)	4 protons and 7 elec	trons			
	(c)	4 protons and 10 e	electrons		(d)	10 protons and 7 ele	ectrons			
				* * * *	*					





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

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