

Max. Marks: 300

Date: 21.10.2022

JB 1 MR BATCH PHYSICS : PART TEST SET-A Topic: FLT

- 1. A particle travels 10 m in first 5 sec and 10 m in next 3 sec. Assuming constant acceleration what is the distance travelled in next 2 sec
 - (a) 8.3 m (b) 9.3 m (c) 10.3 m (d) None of above
- A car moving at 160 km/h when passes the mark-A, driver applies brake and reduces its speed uniformly to 40 km/h at mark-C. The marks are spaced at equal distances along the road as shown below.
 At which part of the track the car has instantaneous speed of 100 km/h? Neglect the size of the car.

				Mark-A	Mark-B	Mark-C		
	(a)	At mark-B			(b)	Between mark-A an	d mark-l	В
	(c)	between mark-B a	und mark	-C	(d)	insufficient informa	tion to d	ecide
3.	A parti	cle is moving alo	ng a stra	hight line with const	ant acce	leration. At the end	of tenth	second its velocity
	become	es 20 m/s and in ter	th secon	d it travels a distance	e of 10 m	. Then the acceleration	on of the	particle will be
	(a)	10 m/s ²	(b)	20 m/s ²	(c)	$\frac{1}{5}$ m/s ²	(d)	3.8 m/s ²
4.	Two ca	urs are moving in t	he same	direction with the sa	ame spee	d 30 km/hr. They a	re separa	nted by a distance of
	5 km, t	he speed of a car m	oving in	the opposite direction	n if it me	eets these two cars at	an interv	al of 4 minutes, will
	be							
	(a)	40 km/hr	(b)	45 km/hr	(c)	30 km/hr	(d)	15 km/hr



An elevator, in which a man is standing, is moving upward with a constant acceleration of 2 m/s². At some instant 5. when speed of elevator is 10 m/s, the man drops a coin from a height of 1.5 m. Find the time taken by the coin to reach the floor.

(a)
$$\frac{1}{\sqrt{3}}$$
 sec (b) $\frac{1}{2}$ sec (c) $\frac{1}{\sqrt{2}}$ sec (d) 1 sec

The velocity-time graph of a body moving in a straight line is shown in the figure. The displacement and distance 6. travelled by the body in 6 sec are resepectively



7. The path of a projectile in the absence of air drag is shown in the figure by dotted line. If the air resistance is not ignored then which one of the path shown in the figure is appropriate for the projectile

						C D x		
(:	a)	В	(b)	А	(c)	D	(d)	С

A stone is projected from the ground with velocity 50 m/s at an angle of 30°. It crosses a wall after 3 sec. How 8. far beyond the wall the stone will strike the ground $(g = 10 \text{ m/sec}^2)$? (a

a)	90.2 m	(b)	89.6 m	(c)	86.6 m	(d)	70.2 m



9. A particle starts moving with velocity 10 m/s in a straight line under an acceleration varying linearly with time. Its velocity time graph is as shown in figure. Its velocity is maximum at t = 3 sec. The time (in sec) when the particle stops is (tan $37^\circ = 3/4$)





13. Rain is falling with speed $12\sqrt{2}$ m/s at an angle of 45° with vertical line. A man in a glider going at a speed of u at angle of 37° with respect to ground. Find the speed of glider so that rain appears to him falling vertically. Consider motion of glider and rain drops in same vertical plane.



14. A body of mass 1 kg lies on smooth inclined plane. The block of mass m is given force F = 10 N horizontally as shown. The magnitude of net normal reaction on the block is:



- (a) $10\sqrt{2}$ N (b) $\frac{10}{\sqrt{2}}$ N (c) 10 N (d) None of these
- 15. A body of mass 2.0 kg is placed on a smooth horizontal surface. Two forces $F_1 = 20$ N and $F_2 = N$ are acting on the body in directions making angles of 30° and 60° to the surface. The reaction of the surface on the body will be





16. M is a fixed wedge. Masses m_1 and m_2 are connected by a light string. The wedge is smooth and the pulley is smooth and fixed. $m_1 = 10$ kg and $m_2 = 7.5$ kg. When m_2 is just released, the distance it will travel in 2 seconds is



17. With what acceleration a should be box of figure moving up so that the block of mass M exerts a force 7 Mg/4 on the floor of the box?



18. In the given diagram, with what force must the man pull the rope to hold the plank in position? Mass of the man is 80 kg. Neglect the weights of plank, rope and pulley. Take $g = 10 \text{ ms}^{-2}$.



Space for Rough Work



19. Three blocks 1, 2 and 3 are arranged as shown in the figure. The velocities of the blocks v_1 , v_2 and v_3 are shown in the figure. What is the relationship between v_1 , v_2 and v_3 ?



- (a) $2v_1 + v_2 = v_3$ (b) $v_1 + v_2 = v_3$ (c) $v_1 + 2v_2 = v_3$ (d) None of these
- 20. A block of mass 2 kg rests on a rough inclined plane making an angle of 30° with the horizontal. The coefficient of static friction between the block and the plane is 0.7. The frictional force on the block is
 - (a) 10 N (b) $7\sqrt{3}$ N (c) $10 \times \sqrt{3}$ N (d) 7 N
- 21. In the arrangement shown in the figure [sin $37^\circ = 3/5$]



- (a) direction of force of friction is up the plane (b) the magnitude of force of friction is zero
- (c) the tension in the string is 20 N (d) magnitude of force of friction is 56 N
- 22. The work done by external agent in stretching a spring of force constant k = 100 N/cm from deformation $x_1 = 10$ to deformation $x_2 = 20$ cm.
 - (a) -150 J (b) 50 J (c) 150 J (d) None of these



- 23. An elastic spring of unstretched length L and force constant K is stretched by amount x. It is further stretched by another length y. The work done in the second stretching is
 - (a) $\frac{1}{2}Ky^2$ (b) $\frac{1}{2}K(x^2 + y^2)$ (c) $\frac{1}{2}K(x + y)^2$ (d) $\frac{1}{2}Ky(2x + y)$
- 24. A toy car of mass 5 kg moves up a ramp under the influence of force F plotted against displacement x. The maximum height attained is given by



25. A slab S of mass m is released from a height h_0 from the top of a spring of force constant k. The maximum compression x of the spring is given by the equation

(a)
$$mgh_0 = \frac{1}{2}kx^2$$

(b) $mg(h_0 - x) = \frac{1}{2}kx^2$
(c) $mgh_0 = \frac{1}{2}k(h_0 + x)^2$
(d) $mg(h_0 + x) = \frac{1}{2}kx^2$





Date: 21.10.2022

JB 1 MR BATCH CHEMISTRY : PART TEST SET-A Topic: FLT

26. A cylinder containing an ideal gas (0.1 mol of 1.0 dm³) is in thermal equilibrium with a large volume of 0.5 molal aqueous solution of ethylene glycol at its freezing point. If the stoppers S_1 and S_2 (as shown in the figure) are suddenly withdrawn, the volume of the gas in litres after equilibrium is achieved will be ______. (Given K_f (water) = 2.0 K kg mol⁻¹, R = 0.08 dm³ atm K⁻¹ mol⁻¹)

		Frictionless piston S2 Ideal gas • •							
	(a)	2.17	(b)	3.48	(c)	2.69	(d)	8.59	
27.	One wo	ould expect proton to	o have v	very large					
	(a)	Ionization potentia	.1		(b)	Radius			
	(c)	Charge			(d)	Hydration energy			
28.	Atomic and neu	number and mass and m	number e respect	of an element M are tively.	25 and :	52 respectively. The	number	of electrons, protons	
	(a)	25, 25 and 27	(b)	25, 27 and 25	(c)	27, 25 and 27	(d)	23, 25 and 27	
29.	The rat	io of energies of two	o photor	ns of wavelengths 200)0 and 40	000 A°.			
	(a)	1:4	(b)	4:1	(c)	1:2	(d)	2:1	
30.	Which of the given sets of temperature and pressure will cause a gas to exhibit the greatest deviation from ideal gas behaviour								
	(a)	100°C and 4 atm	(b)	100°C and 2 atm	(c)	-100 °C and 4 atm	(d)	0°C and 2 atm	



Learning with the Speed of Mumbai and the Tradition of Kota

31.

Based on equation $E = -2.178 \times 10^{-18} J\left(\frac{Z^2}{n^2}\right)$ certain conclusions are written. Which of them is not correct?

- The negative sign in equation simply means that the energy of electron bound to the nucleus is lower than (a) it would be if the electrons were at the infinite distance from the nucleus
- (b) Larger the value of n, the larger is the orbit radius
- Equation can be used to calculate the change in energy when the electron changes orbit (c)
- For n = 1, the electron has a more negative energy than it does for n = 6 which means that the electron is (d) more loosely bound in the smallest allowed orbit
- 32. When an ideal gas undergoes unrestrained expansion, no cooling occurs because the molecules
 - Are above the inversion temperature Exert no attractive force on each other (a) (b)
 - Do work equal to loss in kinetic energy (c) (d) Collide without loss of energy
- Atoms have a mass of the order 33.
 - 10⁻¹⁵ kg 10⁻²⁶ g (a) 10⁻²⁶ kg (b) (c) (d) 10⁻¹⁵ g
- A golf ball has a mass of 40 g, and a speed of 45 m/s. If the speed can be measured with in accuracy of 2%, 34. calculate the uncertainty in the position.
 - 1.59×10^{-33} m 1.46×10^{-33} cm (a) $1.46 \times 10^{-33} \text{ m}$ (b) (c) (d) 1.39×10^{33} km
- For a particular value of azimuthal quantum number (l), the total number of magnetic quantum number (m) in 35. given by:
 - (b) $l = \frac{2m+1}{2}$ $l = \frac{m+1}{2}$ (c) $l = \frac{m-1}{2}$ (d) $m = \frac{2l-1}{2}$ (a)

The maximum probability of finding an electron in the d_{xy} orbital is 36.

- (a) Along the x-axis (b) Along the y-axis
 - (c) At an angle of 45° from the x and y-axes At an angle of 90° from the x and y-axes (d)

The RMS velocity of molecules of a gas of density 4 kg m⁻³ and pressure 1.2×10^5 Nm⁻² is 37. (a) 600 ms^{-1} (b) 300 ms^{-1} (c) 900 ms^{-1} (d) 120 ms⁻¹ 38. The maximum number of electrons in an atom with l = 2 and n = 3 is (a) 2 (b) 6 12 (d) 10 (c) At STP 5.6 L of a gas weigh 60 g. The vapour density of gas is: 39.

60 (b) 120 (c) 30 (d) 240 (a)



40.	9 g of t	rivalent metal comb	oines wit	h 8 g of oxygen. The	atomic	mass of the metal is		
	(a)	9	(b)	18	(c)	27	(d)	36
41.	Equiva	lent weight of H ₂ O ₂	is					
	(a)	17	(b)	34	(c)	68	(d)	18
42.	2 g of a	a metal oxide on stro	ong heat	ing gave 112 ml of O	2 gas at S	STP. Equivalent of th	e metal i	IS
	(a)	56	(b)	92	(c)	112	(d)	50
43.	One m metal c	ole of chlorine com an displace 2gm hy	ibines w drogen f	vith certain weight of from an acid. The equ	metal g ivalent v	giving 111 g of its ch weight of metal is	nloride. 7	The same amount of
	(a)	40	(b)	20	(c)	80	(d)	10
44.	For wh	ich of the following	compo	und equivalent weigh	t is equa	l to molecular weight		
	(a)	H_2SO_4	(b)	H_3PO_2	(c)	H_3PO_4	(d)	H ₃ PO ₃
45.	The ato	omic number of elen	nent Un	q is :				
	(a)	102	(b)	103	(c)	104	(d)	105
46.	Mende alumin	leev predicted the p ium. The elements y	hysical were dis	and chemical propert	ies of th as	e elements. Eka – bo	ron, Eka	a – silicon and Eka –
	(a)	Ge, Sc, Ga	(b)	Sc, Ge, Ga	(c)	Al, Ga, Ge	(d)	Ge, Al, Ga
47.	Lothar	Meyer obtained the	curve fo	or the known element	s by plo	tting their atomic volu	umes aga	ainst
	(a)	atomic numbers	(b)	atomic masses	(c)	densities	(d)	ionization energies
48.	The co	rrect order of the siz	ze of C, I	N, P and S is				
	(a)	N < C < P < S	(b)	C < N < P < S	(c)	C < N < S < P	(d)	N < C < S < P
49.	(A), (B) and (C) are eleme	ents in th	e third short period.	Oxide of	f (A) is ionic, that of	(B) is an	nphoteric and that of
	(C) is a	giant molecule. Th	en (A),	(B) and (C) have atom	nic numl	per in the order		
	(a)	(C) < (B) < (A)	(b)	(A) < (B) < (C)	(c)	(A) < (C) < (B)	(d)	(B) < (A) < (C)
50.	How m	any Cs atoms can b	e conve	rted to Cs ⁺ ions by 1 j	oule ene	ergy if IE_1 for Cs is 37	76 Kj mo	\mathbf{pl}^{-1}
	(a)	1.6×10^{18}	(b)	$1.6 imes 10^{10}$	(c)	5.8×10^{14}	(d)	$5.8 imes10^{25}$





Date: 21.10.2022

JB 1 MR BATCH MATHEMATICS : PART TEST SET-A Topic: FLT

51.	The pr	oduct of the roots of	the equ	ation				
	$x^2 - 4n$	$nx + 3e^{2\log m} - 4 =$	= 0 is 8,					
	then its	roots will be real w	when m e	equals				
	(a)	$\pm\sqrt{2}$	(b)	±2	(c)	$\sqrt{2}$	(d)	1
52.	The nu	mber of solution of	the equa	ation				
	sin (a ^x)	$+\cos(a^{x}) = a^{x} + a^{-1}$	x is $a > 0$)				
	(a)	3	(b)	1	(c)	2	(d)	0
53.	If α,β	are roots of the equ	ation ax	$x^2 + 3x + 2 = 0$ (a < 0)	then $\frac{\alpha^2}{\beta}$	$\frac{\beta^2}{\alpha} + \frac{\beta^2}{\alpha}$ is greater than	l	
	(a)	2	(b)	1	(c)	0	(d)	None of these
54.	The pr	oduct of real roots o	f the equ	ation				
	2x + 3	$ ^2 - 3 2x + 3 + 2 = 0$) is					
	(a)	2	(b)	$\frac{5}{4}$	(c)	$\frac{5}{2}$	(d)	5
55.	Two st	tudents while solvir	ng a qua	dratic equation in x	with lead	ding coefficient 'I' o	ne copie	ed the constant term
	incorre	ctly and got the roo	ts 3 and	2. The other copied t	he const	ant term correctly –6.	The co	rrect roots are
	(a)	-1,6	(b)	-6, -1	(c)	-2,3	(d)	-3, 2
56.	Ifαa	nd β are the roots o	f equatio	$\sin 8x^2 - 3x + 27 = 0 t$	hen $\left(\frac{\alpha^2}{\beta}\right)$	$\left(\frac{\beta^2}{\alpha}\right)^{1/3} + \left(\frac{\beta^2}{\alpha}\right)^{1/3}$ is eq.	ual to	
	(a)	$\frac{1}{4}$	(b)	$\frac{1}{3}$	(c)	$\frac{7}{2}$	(d)	$\frac{1}{16}$



57.	If α an	and β are the roots of	$f x^2 - 2x$	$+4 = 0$ then $\alpha^5 + \beta^5$	is equa	ıl to		
	(a)	16	(b)	32	(c)	64	(d)	None of these
58.	In a ge commo	ometric progression on ratio of this prog	n consist ression e	ing of positive terms quals	each ter	m equals the sum of	the next	two term. Then the
	(a)	$\frac{1}{2}(\sqrt{5}-1)$	(b)	$\frac{1}{2}\sqrt{5}$	(c)	$\sqrt{5}$	(d)	$\frac{1}{\sqrt{2}}\left(1+\sqrt{5}\right)$
59.	$1^3 - 2^3$	$+3^3-4^3+\ldots+9^3$	=					
	(a)	- 475	(b)	425	(c)	475	(d)	-425
60.	If \log_0	$(3^{1+x}+2), \log_3(4+$	$3^{x} - 1) a$	are in A.P., then x equ	als			
	(a)	$1-\log_3 4$	(b)	$\log_4 3$	(c)	$\log_3 4$	(d)	$1 - \log_4 3$
61.	The su	m of the series $\frac{1}{2}$ +	$\frac{3}{4} + \frac{7}{8} + \frac{7}{8}$	$-\frac{15}{16}$ + upto n terms	s is			
	(a)	$n-1+\frac{1}{2^n}$	(b)	$n + \frac{1}{2^n}$	(c)	$2n + \frac{1}{2^n}$	(d)	$n+1+\frac{1}{2^n}$
62.	If $x^2 +$	$9y^2 + 25z^2 = xyz \left(\frac{1}{2}\right)$	$\frac{5}{x} + \frac{5}{y} + \frac{5}{y}$	$\left(\frac{3}{z}\right)$, then x, y and z a	re in			
	(a)	A.P.	(b)	G.P.	(c)	A.G.P.	(d)	H.P.
63.	2 ^{1/4} , 4 ^{1/}	⁸ , $8^{1/16}$ up to ∞ is	s equal to	0				
	(a)	1	(b)	2	(c)	$\frac{3}{2}$	(d)	None of these
64.	The su	m of n terms of the	series					
	$\frac{1}{1+\sqrt{3}}$	$\frac{1}{5} + \frac{1}{\sqrt{3} + \sqrt{5}} + \frac{1}{\sqrt{5}}$	$\frac{1}{1+\sqrt{7}}$ +	is				
	(a)	$\sqrt{2n+1}$	(b)	$\frac{1}{2}\sqrt{2n+1}$	(c)	$\sqrt{2n+1}-1$	(d)	$\frac{1}{2}(\sqrt{2n+1}-1)$



Learning with the Speed of Mumbai and the Tradition of Kota

65.	The val	lue of ${}^{40}C_{31} + \sum_{j=0}^{10} {}^{4}$	^{0+j} C ₁₀₊	$_{j}$ is equal to				
	(a)	$2.45C_{15}$	(b)	${}^{51}C_{20}$	(c)	$2 \cdot {}^{50}C_{20}$	(d)	None of these
66.	The tot	al number of selecti	ons of a	t most n things from ((2n+1)	different things is 63.	Then the	ne value of n is
	(a)	4	(b)	3	(c)	2	(d)	None of these
67.	A total word co	numbers of words ontains at least one	which c vowel is	can be formed out of	the lette	ers a, b, c, d, e, f tak	en 3 tog	ether such that each
	(a)	48	(b)	96	(c)	72	(d)	None of these
68.	A fathe	er with 8 children tal n together more than	kes then 1 once.	n 3 at a time to zoolog The number of times	gical gar each chi	dens, as often as he c ild will go to the gard	an witho en is	ut taking the same 3
	(a)	112	(b)	21	(c)	56	(d)	None of these
69.	A diction If the word C	onary is printed con words are printed at RICKET is	sisting of the alph	of 7 lettered words or abetical order, as in a	ıly than .n ordina	can be made with a leave the second sec	etter of t e numbe	he word CRICKET.
	(a)	481	(b)	530	(c)	531	(d)	480
70.	If a, b, triplet (c are three natural f (a, b, c) is	numbers	s in A.P. and $a + b + b$	c = 21, -	then the possible num	ber of v	alues of the ordered
	(a)	13	(b)	15	(c)	14	(d)	None of these
71.	A ques which a	tion paper is divide a candidate can ansv	d into tv ver 6 qu	wo parts A and B and estions selecting at le	d each p ast two o	art contains 5 question questions from each p	ons. The art is	e number of ways in
	(a)	200	(b)	100	(c)	80	(d)	None of these
72.	The va	lue of $e^{(\log_{18} \cot 1^\circ + \log_{18} \cot$	og ₁₀ cot 2°	$^{\circ}++\log_{10}\cot 89^{\circ})$ is				
	(a)	0	(b)	<u>1</u> e	(c)	1	(d)	e



Learning with the Speed of Mumbai and the Tradition of Kota

73. $\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ + \dots + \sin^2 85^\circ + \sin^2 90^\circ =$

(a)
$$9\frac{1}{2}$$
 (b) 9 (c) 8 (d) 7

74. If $\log_{\cos x} \sin x = 0.5$, when $0 < x < 90^{\circ}$, then the value of $\cos x =$

(a)
$$\frac{\sqrt{5}+1}{4}$$
 (b) $\frac{\sqrt{5}-1}{4}$ (c) $\frac{\sqrt{5}-1}{2}$ (d) $\frac{\sqrt{5}+1}{2}$

* * * * *

75. If $\frac{\cos^4 \alpha}{\cos^2 \beta} + \frac{\sin^4 \alpha}{\sin^2 \beta} = 1$ then the value of $\frac{\cos^4 \beta}{\cos^2 \beta} + \frac{\sin^4 \beta}{\sin^2 \alpha}$ is equal to (a) 0 (b) 1 (c) 2 (d) 4





Date: 21.10.2022

JB 1 MR BATCH PHYSICS : PART TEST SET-A ANSWER KEY Topic: FLT

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

CHEMISTRY : PART TEST SET-A ANSWER KEY Topic: FLT

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

MATHEMATICS : PART TEST SET-A ANSWER KEY Topic: FLT

51.	(b)	52.	(d)	53.	(d)	54.	(c)	55.	(a)
56.	(a)	57.	(b)	58.	(a)	59.	(b)	60.	(a)
61.	(a)	62.	(d)	63.	(b)	64.	(d)	65.	(b)
66.	(d)	67.	(b)	68.	(b)	69.	(b)	70.	(a)
71.	(a)	72.	(c)	73.	(a)	74.	(c)	75.	(b)