विद्या ददाति विनयम्
Knowledge is Discipline
BJNP
Learning with the Speed of Mumbai and the Tradition of Kota

Max. Marks: 200 **Date: 28.11.2022**

JB 3 MR BATCH
PHYSICS : PART TEST (SET A)
Topic: Circular Motion

1. A particle is moving along a circular path of radius 5 m, moving with a uniform speed of 5 ms^{-1}. What will be the average acceleration, when the particle completes half revolution?

   (a) zero (b) $10/\pi$ ms^{-2} (c) 10 ms^{-2} (d) None of these

2. Match the following columns and choose the correct option from the codes given below.

   For uniform circular motion.

	Column I		Colum II
A.	Speed	1.	Constant
B.	Velocity	2.	Variable
C.	Magnitude of acceleration	3.	Zero
D.	Acceleration		

	A	B	C	D		A	B	C	D
(a)	1	2	2	1	(b)	1	2	1	2
(c)	1	1	1	2	(d)	2	1	1	2

3. Two racing cars having masses m_1 and m_2 move in concentric circles of radi r_1 and r_2 respectively. If their angular speeds are same, then the ratio of their linear speeds is

   (a) $m_1 : m_2$ (b) $r_1 : r_2$ (c) 1 : 1 (d) $m_1r_1 : m_2r_2$

4. A wheel completes 2000 revolutions to cover the 9.5 km distance, then the diameter of the wheel is

   (a) 1.5 m (b) 1.5 cm (c) 7.5 cm (d) 7.5 cm

Space for Rough Work

5. The change in the centripetal force of a body moving in a circular path, if speed is made half and radius is made 5 times the original value, will

(a) increase by $\frac{18}{20}$ (b) decrease by $\frac{19}{20}$ (c) decrease by $\frac{9}{20}$ (d) increase by $\frac{17}{20}$

6. A particle is acted upon by a force of constant magnitude which is always perpendicular to the velocity of the particle. The motion of the particle takes place in a plane, it follows that

(a) its velocity is constant (b) its acceleration is constant

(c) its kinetic energy is constant (d) it moves in a straight line

7. In uniform circular motion of a particle

(a) velocity is constant but acceleration is variable (b) velocity is variable but acceleration is constant

(c) both speed and acceleration are constants (d) speed is constant but acceleration is variable

8. The angular velocity of second hand, of a clock is

(a) $\left(\frac{\pi}{6}\right)\text{rad s}^{-1}$ (b) $\left(\frac{\pi}{60}\right)\text{rad s}^{-1}$ (c) $\left(\frac{\pi}{30}\right)\text{rad s}^{-1}$ (d) $\left(\frac{\pi}{15}\right)\text{rad s}^{-1}$

9. A car wheel is rotated to uniform angular acceleration about its axis, Initially its angular velocity is zero. It rotates through an angle θ_1 in the first 2 s, in the next 2 s, it rotates through an additional angle θ_2, the ratio of $\frac{\theta_2}{\theta_1}$ is

(a) 1 (b) 2 (c) 3 (d) 5

10. The angular speed of a car increases from 600 rpm to 1200 rpm in 10 s. What is the angular acceleration of the car?

(a) 600 rad s^{-1} (b) 60 rad s^{-1} (c) 60π rad s^{-1} (d) 2π rad s^{-1}

Space for Rough Work

11. Velocity vector and acceleration vector in a uniform circular motion are related as

(a) both in the same direction (b) perpendicular to each other
(c) both in opposite direction (d) not related to each other

12. One end of a string of length 1.0 m is tied to a body of mass 0.5 kg. It is whirled in a vertical circle with angular frequency 4 $rads^{-1}$. The tension in the string when the body is at the lower most point of its motion will be equal to (Take, g = 10 ms^{-2})

(a) 3 N (b) 5 N (c) 8 N (d) 13 N

13. In hydrogen atom, the electron is moving round the nucleus with velocity 2.18×10^6 ms^{-1} in an orbit of radius 0.528 Å. The acceleration of the electron is

(a) 9×10^{18} ms^{-2} (b) 9×10^{22} ms^{-2} (c) 9×10^{-22} ms^{-2} (d) 9×10^{12} ms^{-2}

14. A particle P is moving in a circle of radius r with a uniform speed v. C is the centre of the circle and AB is the diameter. The angular velocity of P about A and C is in ratio

(a) 1 : 1 (b) 1 : 2 (c) 2 : 1 (d) 4 : 1

15. A wheel rotates with a constant angular velocity of 300 rpm. The angle through which the wheel rotates in 1 s is

(a) π rad (b) 5π rad (c) 10π rad (d) 20π rad

16. Two particles of masses in the ratio 3 : 5 are moving in circular paths of radii in the ratio 4 : 7 with time periods in the ratio 4 : 5. The ratio of their centripetal forces is

(a) 16/28 (b) 15/28 (c) 192/875 (d) 23/28

17. A cosmonaut is orbiting the earth in a spacecraft at an altitude h = 630 km with a speed of 8 kms^{-1}. If the radius of the earth is 6400 km, the acceleration of the cosmonaut is

(a) 9.10 ms^{-2} (b) 9.80 ms^{-2} (c) 10.0 ms^{-2} (d) 9.88 ms^{-2}

18. A coin placed on a rotating turn table just slips if it is placed at a distance of 8 cm from the centre. If angular velocity of the turn table is doubled. It will just slip at a distance of

(a) 1 cm (b) 2 cm (c) 4 cm (d) 8 cm

Space for Rough Work

19. A car of mass 1000 kg moves on a circular track of radius 20 m. If the coefficient of friction is 0.64, then the maximum velocity with which the car can move is

(a) 22.4 ms^{-1} (b) 5.6 ms^{-1} (c) 11.2 ms^{-1} (d) None of these

20. The coefficient of friction between the tyres and the road is 0.25. The maximum speed with which car can be driven round a curve of radius 40 m without skidding is (Given, g = 10 ms^{-2})

(a) 40 ms^{-1} (b) 20 ms^{-1} (c) 15 ms^{-1} (d) 10 ms^{-1}

21. A body moves along a circular path of radius 10 m and the coefficient of friction is 0.5. What should be its angular speed (in rad s^{-1}), if it is not to slip from the surface? (Given, g = 9.8 ms^{-2})

(a) 5 (b) 10 (c) 0.1 (d) 0.7

22. A body is just being revolved in a vertical circle of radius R with a uniform speed. The string breaks when the body is at the highest point. The horizontal distance covered by the body after the string breaks is

(a) 2R (b) R (c) $R\sqrt{2}$ (d) 4R

23. A railway carriage has its centre of gravity at a height of 0.75 m above the rails, which are 1 m apart. The maximum safe speed at which it could travel round on unbanked curve of radius 100 m is

(a) 12 ms^{-1} (b) 18 ms^{-1} (c) 22 ms^{-1} (d) 27 ms^{-1}

24. A cyclist is moving in a circular track of radius 80 m with a velocity v = 36 kmh^{-1}. He has to lean from the vertical approximately through an angle (Given, g = 10 ms^{-2})

(a) $\tan^{-1}(4)$ (b) $\tan^{-1}\left(\frac{1}{8}\right)$ (c) $\tan^{-1}\left(\frac{1}{4}\right)$ (d) $\tan^{-1}(2)$

25. A body of mass 1 kg is rotating in a vertical circle of radius 1 m. What will be the difference in kinetic energy at the top and at the bottom of the circle?

(Given, g = 10 ms^{-2})

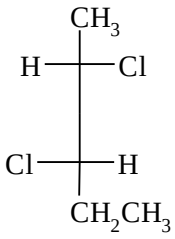
(a) 50 J (b) 30 J (c) 20 J (d) 10 J

Space for Rough Work

Max. Marks: 100 **Date: 28.11.2022**

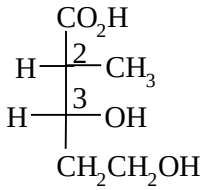
JB 3 MR BATCH (Set A)
CHEMISTRY : PART TEST
Topic: Stereoisomerism

26. What is the configuration of the following molecule?



(a) 2S, 3R (b) 3R, 3S (c) 2S, 3S (d) 2R, 3R

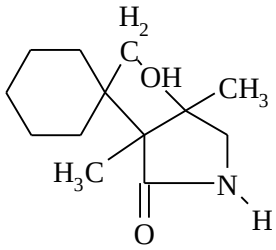
27. In the Fischer projection formula given below, what are the configurations of the two asymmetric centers?



(a) 2R, 3R (b) 2R, 3S (c) 2S, 3R (d) 2S, 3S

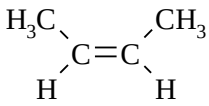
Space for Rough Work

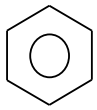
28. How many chiral carbon centers are present in the following molecule?

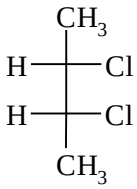


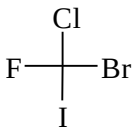
(a) 0 (b) 1 (c) 2 (d) 3

29. Which of the following has no. P.O.S. (plane of symmetry)?

(a) 

(b) 

(c) 

(d) 

30. How many stereoisomers are there for 1-ethyl-3-methylcyclohexane?

(a) 2 (b) 3 (c) 4 (d) 6

Space for Rough Work

31. Consider the following two stereoisomers. How are they different?

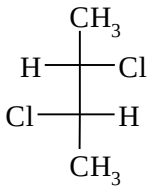
(a) They have different melting points

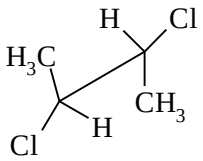
(b) They rotate plane-polarized light in opposite directions

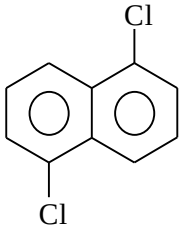
(c) They have different solubilities in water

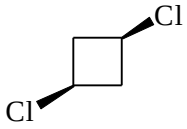
(d) They have different indices of refraction

32. Identify meso compound:

(a) 

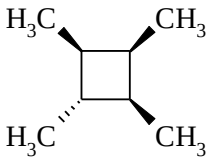
(b) 

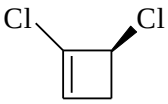
(c) 

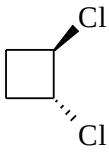
(d) 

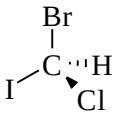
Space for Rough Work

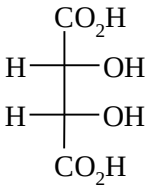
33. In which of the following compound have plane of symmetry?

(a) 

(b) 

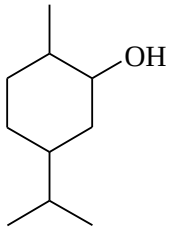
(c) 

(d) 

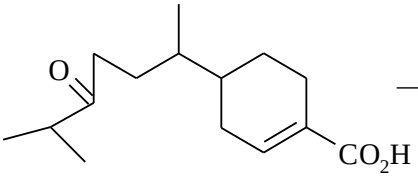
34. 

; Number of planes of symmetry in the given compound is:

(a) 1 (b) 2 (c) 3 (d) 4

35. 

⟶ (a) (Number of chiral centers)



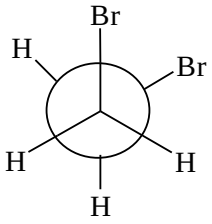
⟶ (b) (Number of chiral centers)

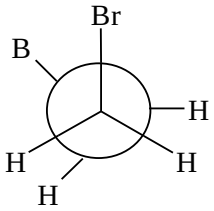
sum of chiral centers (a + b = ?) is:

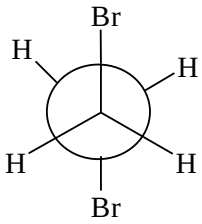
(a) 3 (b) 4 (c) 5 (d) 6

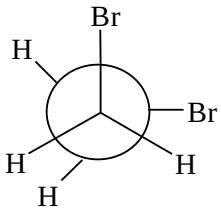
Space for Rough Work

36. The most stable conformation of 2, 3-dibromobutane is

(a) 

(b) 

(c) 

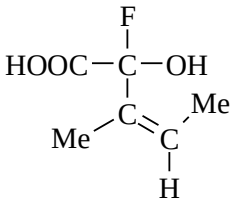
(d) 

37. Which of the following molecules can exhibit optical activity

(a) 1-bromopropane (b) 2-bromobutane

(c) 3-bromopentane (d) Bromocyclohexane

38. The configuration of the chiral centre and the geometry of the double bond in the following molecule can be described by



(a) R and E (b) S and E (c) R and Z (d) S and Z

Space for Rough Work

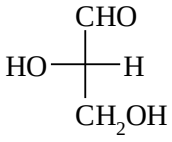
39. How many stereoisomers does this molecule have $CH_3CH = CHCH_2CHBrCH_3$

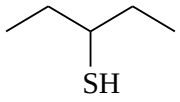
(a) 8 (b) 2 (c) 4 (d) 6

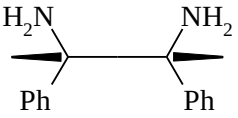
40. If 'n' represents total number of asymmetric carbon atoms in a compound, the possible number of optical isomers of the compound is

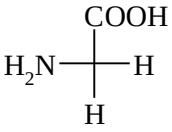
(a) 2n (b) n^2 (c) 2^n (d) 2n + 2

41. Which of the following molecules is expected to rotate the plane polarized light

(a) 

(b) 

(c) 

(d) 

42. An organic compound

$^1CH_3 - ^2CH_2 - ^3CH_2 - ^4CH_2 - ^5CH_2 - ^6CH_2 - ^7CH_3$

To make it chiral compound the attack should be on which carbon atom

(a) 1 (b) 3 (c) 4 (d) 7

43. Which of the following molecule contains asymmetric carbon atom

(a) $CH_3CHClCOOH$ (b) CH_3CH_2COOH (c) $ClCH_2CH_2COOH$ (d) $Cl_2CHCOOH$

44. Which of the following compounds will exhibit geometrical isomerism

(a) 1-phenyl-2-butene (b) 3-phenyl-1-butene

(c) 2-phyenyl-1-butene (d) 1, 1-diphenyl-1-propene

Space for Rough Work

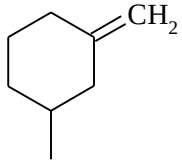
45. Reason for geometrical isomerism shown by 2-butene is

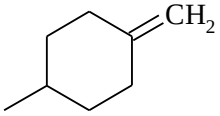
(a) Chiral carbon
(b) Free rotation about single bond
(c) Free roation about double bond
(d) Restricted rotation about double bond

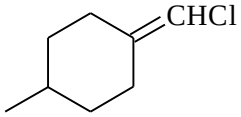
46. Which of the following does not show geometrical isomerism

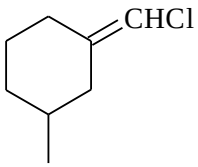
(a) 1, 2-dichloro-1-pentene
(b) 1, 3-dichloro-2-pentene
(c) 1, 1-dichloro-1-pentene
(d) 1, 4-dichloro-2-pentene

47. The geometrical isomerism is shown by

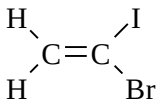
(a) 

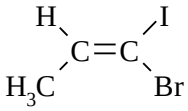
(b) 

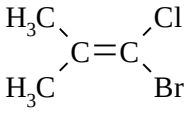
(c) 

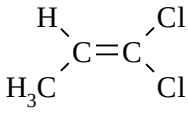
(d) 

48. Which shows geometrical isomerism

(a) 

(b) 

(c) 

(d) 

Space for Rough Work

49. Geometrical isomerism is not possible in

(a) Propene
(b) 3-hexene
(c) Butenedioic acid
(d) Cyclic compound

50. Among the following the most stable compound is

(a) cis-1, 2-cyclohexanediol
(b) trans-1, 2-cyclohexanediol
(c) cis-1, 3-cyclohexanediol
(d) trans-1, 3-cyclohexanediol

Space for Rough Work

विद्या ददाति विनयम्
Knowledge is Discipline
BJNP
Learning with the Speed of Mumbai and the Tradition of Kota

Max. Marks: 200 **Date: 28.11.2022**

JB 3 MR BATCH
PHYSICS : PART TEST (SET A) ANSWER KEY
Topic: Circular Motion

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

Date: 28.11.2022

JB 3 MR BATCH
CHEMISYRY : PART TEST (SET A) ANSWER KEY
Topic: Stereoisomerism

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