

NEW STANDARD ACADEMY

Marks:300

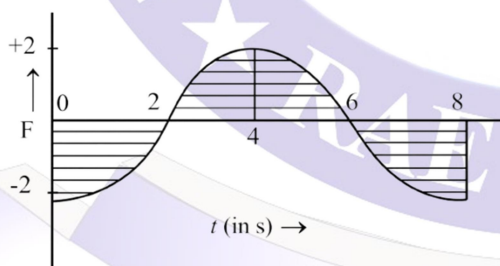
Date : 04-08-2026

CLASS : 11TH JEE

Time: 3 hours

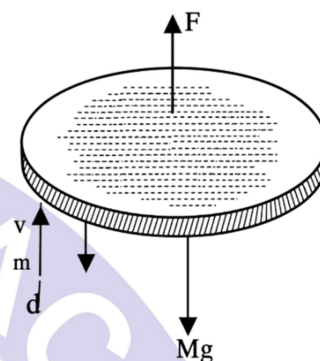
PHYSICS

- A material body A of mass m_1 exerts a force on another material body B of mass m_2 . If the acceleration of B be a_2 , the magnitude of the acceleration of A is :-
 (1) Zero (2) $m_2 a_2 / m_1$
 (3) $m_1 a_2 / m_2$ (4) a_2
- The velocity acquired by a mass m in travelling a certain distance d starting from rest under the action of a constant force is directly proportional to :-
 (1) $\sqrt{m}$ (2) m^0
 (3) $\frac{1}{\sqrt{m}}$ (4) m
- Gravel is dropped onto a conveyer belt at a rate of 0.5 kg/s. The extra force required in newton to keep the belt moving at 2 m/s is:-
 (1) 1 N (2) 2 N
 (3) 4 N (4) 0.5 N
- Force-time graph for the motion of a body is shown in fig. Change in linear momentum between 0 to 8 s is:-

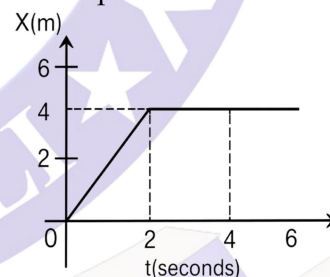


- (1) Zero (3) 8 N-s
 (2) 4 N-s (4) None
- A disc of mass 1.0 kg is kept floating horizontally in air by firing bullets of mass 0.05 kg each vertically at it, at the rate of 10 per second. If the bullets rebound with the same speed, the speed with which these

are fired will be-



- (1) 0.098 m/s (2) 0.98 m/s
 (3) 9.8 m/s (4) 98.0 m/s
- n bullet strike per second elastically on a wall and rebound. What will be the force exerted on the wall by bullets if mass of each bullet is m :-
 (1) mnv (2) $4mnv$
 (3) $2mnv$ (4) $\frac{mnv}{2}$
- In the figure given below, the position-time graph of a particle of mass 0.1 kg is shown. The impulse at $t = 2$ sec is



- (1) 0.2kg - m / s
 (2) - 0.2kg - m / s
 (3) 0.1kg + - m / s
 (4) - 0.4kg - m / s
- A force of 10 N acts on a body of mass 20 kg for 10 seconds. The change in its momentum is
 (1) 50 kg-m/s (2) 100 kg-m/s
 (3) 300 kg-m/s (4) 1000 kg-m/s

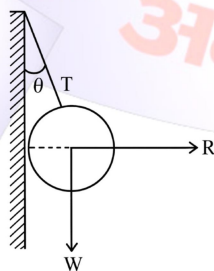
9. Ten one-rupee coins are put on top of each other on a table. Each coin has a mass m . Which of the following statements is not true? (counted from the bottom)

- (1) The force on the 6th coin due to all the coins on its top is equal to $4mg$ (downwards). S
- (2) The force on the 6th coin due to the 7th $4mg$ (downwards) the 7th col coin is
- (3) The reaction of the 6th coin on the 7th coin is $4mg$ (upwards).
- (4) The total force on the 10th coin is $9mg$ (downwards)

10. A mass of 6 kg is suspended by a rope of length 2 m from a ceiling. A force of 50 N is applied in horizontal direction at the mid point of the rope. What is the angle between the rope and the vertical in equilibrium :-

- (1) $\tan^{-1}(4/5)$
- (2) $\tan^{-1}(5/4)$
- (3) $\tan^{-1}(5/6)$
- (4) None

11. A metal sphere is hung by a string fixed to a wall. The forces acting on the sphere are shown in fig. Which of the following statements is correct?



- (a) $\vec{R} + \vec{T} + \vec{W} = 0$
- (b) $T^2 = R^2 + W^2$
- (c) $T = R + W$
- (d) $R = W \tan \theta$

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

12. A block of mass m is placed on a smooth wedge of inclination θ . The whole system is accelerated horizontally so that the block does not slip on the wedge. The force exerted by the wedge on the block (g is acceleration due to gravity) will be :-

- (1) $mg \sin \theta$
- (2) mg
- (3) $mg/\cos \theta$
- (4) $mg \cos \theta$

13. A small sphere is suspended by a string from the ceiling of a car. If the car begins to move with a constant acceleration $(g)/2$ the inclination of the string with the vertical is

- (1) $\tan^{-1}(1/2)$ in the direction of motion
- (2) $\tan^{-1}(1/2)$ opposite to the direction of motion
- (3) $\tan^{-1}(2)$ in the direction of motion
- (4) $\tan^{-1}(2)$ opposite to the direction of motion

14. Two particles of masses m and M ($M > m$) are connected by a cord that passes over a massless and frictionless pulley. The tension T in the string and the acceleration a of the particles is :-

- (1) $T = \frac{2mM}{(M-m)} g$; $a = \left(\frac{mM}{m+M}\right) g$
- (2) $T = \frac{2mM}{(M+m)} g$; $a = \left(\frac{m-M}{m+M}\right) g$
- (3) $T = \frac{M-m}{(M+m)} g$; $a = \left(\frac{2mM}{m+M}\right) g$
- (4) $T = \frac{mM}{(M+m)} g$; $a = \left(\frac{2mM}{m+M}\right) g$

15. Three masses M_1 , M_2 and M_3 are lying on a 2 frictionless table. The masses are connected by massless threads as shown. The mass M_3 is pulled by a constant force F as shown. The tension in the thread between masses M_2 and M_3 is

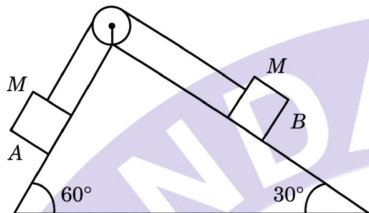


- (1) $\left(\frac{M_1 + M_2}{M_1 + M_2 + M_3}\right) F$
- (2) $\left(\frac{M_2 + M_3}{M_1 + M_2 + M_3}\right) F$

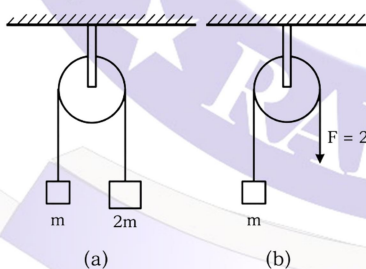
(3) $\left(\frac{M_1+M_3}{M_1+M_2+M_3}\right) F$

(4) $\left(\frac{M_1-M_2}{M_1+M_2+M_3}\right) F$

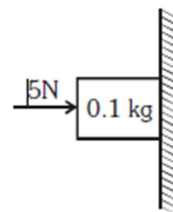
16. Two blocks each of mass M are resting on a frictionless inclined planes as shown in fig. then



- (1) The block A moves down the plane
 (2) The block B moves down the plane
 (3) Both the blocks remain at rest
 (4) Both the blocks move down the plane.
17. The pulley arrangements shown in the figure are identical, the mass of the rope being negligible. In case (a) mass m is lifted by attaching a mass of $2m$ to the other end of the rope. In case (b) the mass m is lifted by pulling the other end of the rope with a constant downward force $F = 2mg$, where g is the acceleration due to gravity. The acceleration of mass m in case (a) is :-

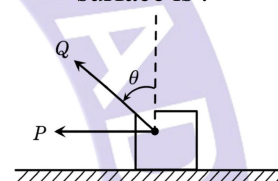


- (1) Zero
 (2) More than that in case (b)
 (3) Less than that in case (b)
 (4) Equal to that in case (b)
18. A block of mass 0.1 kg is pressed against a wall with a horizontal force of 5 N as shown in the figure. If the coefficient of friction between the wall and the block is 0.5 then the frictional force acting on the block will be ($g = 9.8 \text{ m/s}^2$) :-

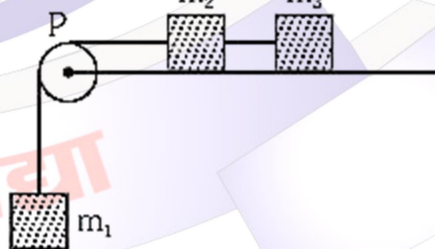


- (1) 9.8 N
 (2) 2.5 N
 (3) 0.98 N
 (4) 0.49 N

19. A block of mass m lying on a rough horizontal plane is acted upon by a horizontal force P and another force Q inclined at an angle θ to the vertical. The block will remain in equilibrium if the coefficient of friction between it and the surface is :-



- (1) $\frac{P+Q \sin \theta}{mg+Q \cos \theta}$
 (2) $\frac{P \cos \theta + Q}{mg - Q \sin \theta}$
 (3) $\frac{P+Q \cos \theta}{mg+Q \sin \theta}$
 (4) $\frac{P \sin \theta + Q}{mg+Q \cos \theta}$
20. A system consists of three masses m_1 , m_2 and m_3 connected by a string passing over a pulley P . The mass m_1 hangs freely, m_2 and m_3 are on a rough horizontal table (the coefficient of friction $= \mu$). The pulley is frictionless and is of negligible mass. The downward acceleration of mass m_1 is: (Assume $m_1 = m_2 = m_3 = m$)



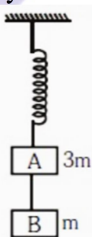
- (1) $\frac{g(1-2\mu)}{9}$
 (2) $\frac{2g\mu}{3}$
 (3) $\frac{g(1-2\mu)}{3}$
 (4) $\frac{g(1-2\mu)}{2}$
21. Three blocks A, B and C of masses 4 kg , 2 kg and 1 kg respectively, are in contact on a frictionless surface, as shown. If a force of 14 N is applied on the 4 kg block, then

the contact force between A and B is:



- (1) 6 N (2) 8 N
(3) 18 N (4) 2 N

22. Two blocks A and B of masses $3m$ and m respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in figure. The magnitudes of acceleration of A and B immediately after the string is cut, are respectively :-



- (1) $\frac{g}{3}, g$ (2) g, g
(3) $\frac{g}{3}, \frac{g}{3}$ (4) $g, \frac{g}{3}$

23. A block of mass m is placed on a smooth inclined wedge ABC of inclination e as shown in the figure. The wedge is given an acceleration

24. A truck is stationary and has a bob suspended by a light string, in a frame attached to the truck. The truck, suddenly moves to the right with an acceleration of a . The pendulum will tilt :-
(1) to the left and angle of inclination of the pendulum with the vertical is $\sin^{-1}(g/a)$
(2) to the left and angle of inclination of the pendulum with the vertical is $\tan^{-1}(a/g)$
(3) to the left and angle of inclination of the pendulum with the vertical is $\sin^{-1}(a/g)$
(4) to the left and angle of inclination of the pendulum with the vertical is $\tan^{-1}(g/a)$

25. A body of mass m is kept on a rough horizontal surface (coefficient of friction = μ) A horizontal force is applied on the body, but it does not move. The resultant of normal reaction and the frictional force

acting on the object is given by F , where F is:

- (1) $|\vec{F}| = mg + \mu mg$
(2) $|\vec{F}| = \mu mg$
(3) $|\vec{F}| \leq mg + \sqrt{1 + \mu^2}$
(4) $|\vec{F}| = mg$

CHEMISTRY

26. Match List-I with List-II

List-I (Classification of molecules based on octet rule)		List-II (Example)	
A.	Molecules obeying octet rule	I.	NO, NO ₂
B.	Molecules with incomplete octet	II.	BCl ₃ , AlCl ₃
C.	Molecules with incomplete octet with odd electron	III.	H ₂ SO ₄ , PCl ₅
D.	Molecules with expanded octet	IV.	CCl ₄ , CO ₂

- (1) A-IV, B-II, C-I, D-III
(2) A-IV, B-I, C-III, D-II
(3) A-III, B-II, C-I, D-IV
(4) A-II, B-IV, C-III, D-I

27. Arrange the following in the decreasing order of their covalent character:

- (A) LiCl (B) NaCl
(C) KCl (D) CsCl

Choose the most appropriate answer from the options given below:

- (1) (A) > (C) > (B) > (D)
(2) (B) > (A) > (C) > (D)
(3) (A) > (B) > (C) > (D)
(4) (A) > (B) > (D) > (C)

28. The number of following factors which affect the percent covalent character of the ionic bond is _____

- (1) Polarising power of cation
(2) Extent of distortion of anion
(3) Polarisability of the anion
(4) Polarising power of anion

29. Match List - I with List - II.

- | List - I | List - II |
|----------------------|--------------|
| Molecule | Shape |
| (A) BrF ₅ | (I) T-shape |
| (B) H ₂ O | (II) See saw |

- (C) ClF_3 (III) Bent
(D) SF_4 (IV) Square pyramidal

Choose the correct answer from the options given below:

- (1) (A)-(I), (B)-(II), (C)-(IV), (D)-(III)
(2) (A)-(II), (B)-(I), (C)-(III), (D)-(IV)
(3) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
(4) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

30. The correct statement about ICl_5 and ICl_4^- is
(1) ICl_5 is trigonal bipyramidal and ICl_4^- is tetrahedral.
(2) ICl_5 is square pyramidal and ICl_4^- is tetrahedral.
(3) ICl_5 is square pyramidal and ICl_4^- is square planar.
(4) Both are isostructural.

31. Which of the following are isostructural pairs?
A. SO_4^{2-} and CrO_4^{2-} B. SiCl_4 and TiCl_4
C. NH_3 and NO_3^- D. BCl_3 and BrCl_3
(1) C and D only (2) A and B only
(3) A and C only (4) B and C only

32. Match List -I with List - II:

List - I	List-II
(Species)	(Hybrid Orbitals)
(a) SF_4	(i) sp^3d^2
(b) IF_5	(ii) $\text{d}^2\text{s p}^3$
(c) NO_2^+	(iii) sp^3d
(d) NH_2^+	(iv) sp^3
	(v) sp

Choose the correct answer from the options given below:

- (1) (a)-(iii), (b)-(i), (c)-(v) and (d)-(iv)
(2) (a)-(ii), (b)-(i), (c)-(iv) and (d)-(v)
(3) (a)-(iv), (b)-(iii), (c)-(ii) and (d)-(v)
(4) (a)-(i), (b)-(ii), (c)-(v) and (d)-(iii)

33. In the structure of SF_4 , the lone pair of electrons on S is in.
(1) equatorial position and there are two lone pair-bond pair repulsions at 90° .

- (2) equatorial position and there are three lone pair-bond pair repulsions at 90° .
(3) axial position and there are three lone pair-bond pair repulsion at 90° .
(4) axial position and there are two lone pair-bond pair repulsion at 90° .

34. Match List I with List II.

List I	List II
A. XeF_4	I. See-saw
B. SF_4	II. Square planar
C. NH_4^+	III. Bent T-shaped
D. BrF_3	IV. Tetrahedral

Choose the correct answer from the options given below:

- (1) A - IV B - I C - II D - III
(2) A - II B - I C - III D - IV
(3) A - II B - I C - IV D - III
(4) A - IV B - III C - II D - I

35. Match List I with List II.

List I	List II
(molecules ions)	(No. of lone pairs of e^- on central atom)
A. IF_7	I. Three
B. ICl_4^-	II. One
C. XeF_6	III. Two
D. XeF_2	IV. Zero

Choose the correct answer from the options given below:

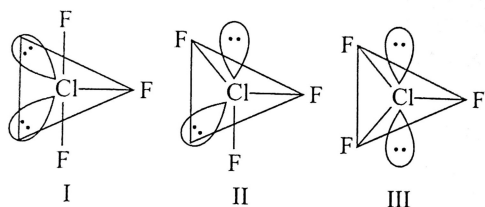
- (1) A - IV B - I, C - II D - III
(2) A - II B - I C - IV D - III
(3) A - II B - III, C - IV D - I
(4) A - IV B - III, C - Pi D - I

36. The molecules having square pyramidal geometry are

- (1) SbF_5 & PCl_5 (2) SbF_5 & XeOF_4
(3) BrF_5 & PCl_5 (4) BrF_5 & XeOF_4

37. Given below are two statements:

Statement (I): For ClF_3 , all three possible structures may be drawn as follows.



Statement (II) : Structure III is most stable, as the orbitals having the lone pairs are axial, where the lp - bp repulsion is minimum.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Statement I is incorrect but statement II is correct.
- (2) Statement I is correct but statement II is incorrect.
- (3) Both Statement I and statement II are correct.
- (4) Both Statement I and statement II are incorrect.

38. Match the LIST-I with LIST-II.

List-I	List-II
Molecule/ion	Bond pair: lone pair (on the central atom)
A. ICl_2^-	I. 4:2
B. H_2O	II. 4:1
C. SO_2	III. 2:3
D. XeF_4	IV. 2:2

Choose the correct answer from the options given below :

- (1) A-IV, B-III, C-II, D-I
- (2) A-III, B-IV, C-II, D-I
- (3) A-III, B-IV, C-I, D-II
- (4) A-II, B-I, C-IV, D-III

39. Arrange the following bonds according to their average bond energies in descending order:

C-Cl, C - Br, C - F C - I

- (1) C - Br > C - I > C - Cl > C - F
- (2) C-Cl > C - Br > C - I > C - F
- (3) C - F > C - Cl > C - Br > C - I
- (4) C - I > C - Br > C - Cl > C - F

40. The correct increasing order for bond angles among BF_3 , PF_3 and ClF_3 is:

- (1) $\text{ClF}_3 < \text{PF}_3 < \text{BF}_3$
- (2) $\text{BF}_3 = \text{PF}_3 < \text{ClF}_3$
- (3) $\text{BF}_3 < \text{PF}_3 < \text{ClF}_3$
- (4) $\text{PF}_3 < \text{BF}_3 < \text{ClF}_3$

41. The dipole moments of CCl_4 , CHCl_3 and CH_4 are in the order:

- (1) $\text{CH}_4 < \text{CCl}_4 < \text{CHCl}_3$
- (2) $\text{CHCl}_3 < \text{CH}_4 = \text{CCl}_4$
- (3) $\text{CH}_4 = \text{CCl}_4 < \text{CHCl}_3$
- (4) $\text{CCl}_4 < \text{CH}_4 < \text{CHCl}_3$

42. Given below are two statements:

Statement - I: Noble gases have very high boiling points.

Statement - II: Noble gases are monoatomic gases. They are held together by strong dispersion forces. Because of this they are liquefied at very low temperature. Hence, they have very high boiling points.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Statement I is false but Statement II is true.
- (2) Both Statement I and Statement II are true.
- (3) Statement I is true but Statement II is false.
- (4) Both Statement I and Statement II are false.

43. Given below are two statements : One is labelled as

Assertion (A) and the other is labelled as Reason (R)

Assertion (A): NH_2 and NF_3 molecule have pyramidal shape with a lone pair of electrons on nitrogen atom. The resultant dipole moment of NH_3 is greater than that of NF_3 . Reason (R): In NH_3 the dipole due to lone pair is in the same direction as the resultant dipole moment of the N-H bonds.

F is the most electronegative element.

In the light of the above statements, choose the correct answer from the options given below:

- (1) (A) is true but (R) is false
- (2) Both (A) and (R) are true but (R) is NOT the correct explanation of (A)
- (3) (A) is false but (R) is true
- (4) Both (A) and (R) are true and (R) is the correct explanation of (A)

44. Arrange the following compounds in increasing order of their dipole moment:

HBr, H₂S, NF₃ and CHCl₃

- (1) NF₃ < HBr < H₂S < CHCl₃
- (2) CHCl₃, <NF₃ < HBr < H₂S
- (3) HBr < H₂S < NF, <CHCl₃
- (4) H₂S < HBr < NF₃ < CHCl₃

45. The bond order and the magnetic characteristics of CN⁻ are:

- (1) 3, paramagnetic
- (2) $2\frac{1}{2}$ paramagnetic
- (3) 3, diamagnetic
- (4) $2\frac{1}{2}$ diamagnetic

46. Match List-I with List-II.

List-I (Molecule)	List-II (Bond order)
(a) Ne ₂	(i) 1
(b) N ₂	(ii) 2
(c) F ₂	(iii) 0
(d) O ₂	(iv) 3

Choose the correct answer from the options given below:

- (1) (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)
- (2) (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)
- (3) (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)
- (4) (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)

47. In the following the correct bond order sequence is :

- (1) $O_2^{2-} < O_2^- < O_2 < O_2^+$
- (2) $O_2^- < O_2^{2-} < O_2 < O_2^+$
- (3) $O_2^- < O_2^{2-} < O_2^+ < O_2$
- (4) $O_2^- < O_2^+ < O_2^{2-} < O_2$

48. In which of the following processes, the bond order increases and paramagnetic character changes to diamagnetic one?

- (1) $N_2 \rightarrow N_2^+$
- (2) $NO \rightarrow NO^+$
- (3) $O_2 \rightarrow O_2^+$
- (4) $O_2 \rightarrow O_2^{2-}$

49. Match List-I with List-II.

List-I	List-II
(A) $\Psi_{100} = \Psi_A - \Psi_B$	(I) Dipole moment
(B) $\mu = Q \times r$	(II) Bonding molecular orbital
(C) $\frac{N_A - N_B}{N_A + N_B}$	(III) Antibonding molecular orbital
(D) $\Psi_{200} = \Psi_A + \Psi_B$	(IV) Bond order

- (1) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)
- (2) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
- (3) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
- (4) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

50. According to MO theory the bond orders for O₂²⁻, CO and NO⁺ respectively, are

- (1) 1, 3 and 3
- (2) 2, 3 and 3
- (3) 1, 2 and 3
- (4) 1, 3 and 2

MATHS

51. The angle in degree measure between two hand of a clock at 8:30 pm is

- (1) 55°
- (2) 66°
- (3) 75°
- (4) 80°

52. The range of $4 + 5 \cos x$ is

- (1) [-1,9]
- (2) (-1,9]
- (3) (-1,9)
- (4) (-1.9)

53. The value of $2 \sin^2 \frac{\pi}{6} + \operatorname{cosec}^2 \frac{7\pi}{6} \cdot \cos^2 \frac{\pi}{3}$ is equal to

- (1) 1
- (2) $\frac{3}{2}$
- (3) -1
- (4) 2

54. The value of $\cos\left(\frac{3\pi}{2} + x\right) \cdot \cos(2\pi + x) \left[\cot\left(\frac{3\pi}{2} - x\right) + \cot(2\pi + x) \right]$ is

- (1) -1
- (2) 0
- (3) 1
- (4) 2

55. The value of $\tan 1^\circ \cdot \tan 2^\circ \cdot \tan 3^\circ \dots \tan 89^\circ$ is

- (1) 0
- (2) 1
- (3) $\frac{1}{2}$
- (4) 2

56. Which of the following is correct?

- (1) $\sin 1^\circ > \sin 1$
- (2) $\sin 1^\circ < \sin 1$
- (3) $\sin 1^\circ = \sin 1$
- (4) $\sin 1^\circ = \frac{\pi}{180} \sin 1$

57. If $\sin \theta = -\frac{4}{5}$ and θ lies in third quadrant

then the value of $\cos \frac{\theta}{2}$ is

- (1) $\frac{1}{5}$ (2) $-\frac{1}{\sqrt{10}}$
(3) $-\frac{1}{\sqrt{5}}$ (4) $\frac{1}{\sqrt{5}}$

58. In triangle ABC, if $\sin A \cos B = 1/4$ and $3 \tan A = \tan B$, then $\cot^2 A$ is equal to

- (1) 2 (2) 3
(3) 4 (4) 5

59. If $\tan^2 \frac{\pi-A}{4} + \tan^2 \frac{\pi-B}{4} + \tan^2 \frac{\pi-C}{4} = 1$, then ΔABC is

- (1) equilateral (2) isosceles
(3) scalene (4) none of these

60. If $\alpha = \frac{\pi}{14}$ then the value of $(\tan \alpha \tan 2\alpha + \tan 2\alpha \tan 4\alpha + \tan 4\alpha \tan \alpha)$ is

- (1) 1 (2) $1/2$
(3) 2 (4) $1/3$

61. If x, y, z are in A.P., then $\frac{\sin x - \sin z}{\cos z - \cos x}$ is equal to

- (1) $\tan y$ (2) $\cot y$
(3) $\sin y$ (4) $\cos y$

62. If x_1 and x_2 are two distinct roots of the equation $a \cos x + b \sin x = c$ then $\tan \frac{x_1 + x_2}{2}$ is equal to

- (1) a/b (2) b/a
(3) c/a (4) a/c

63. The roots of the equation $4x^2 - 2\sqrt{5}x + 1 = 0$ are

- (1) $\sin 36^\circ \sin 18^\circ$ (2) $\sin 18^\circ \cos 36^\circ$
(3) $\sin 36^\circ \cos 18^\circ$ (4) $\cos 18^\circ \cos 36^\circ$

64. If $\alpha, \beta, \gamma, \delta$ are the smallest positive angles in ascending order of magnitude which have their sines equal to the positive quantity k , then the value of $4 \sin \frac{\alpha}{2} + 3 \sin \frac{\beta}{2} + 2 \sin \frac{\gamma}{2} + \sin \frac{\delta}{2}$ is equal to

- (1) $2\sqrt{1-k}$ (2) $2\sqrt{1+k}$
(3) $\frac{\sqrt{1+k}}{2}$ (4) none of these

65. The value of $\sin^3 10^\circ + \sin^3 50^\circ - \sin^3 70^\circ$ is equal to

- (1) $-3/2$ (2) $3/4$
(3) $-3/4$ (4) $3/8$

66. The expression $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A}$ can be written as:

- (1) $\sin A \cos A + 1$ (2) $\sec A \operatorname{cosec}(A) + 1$
(3) $\tan A + \cot A$ (4) $\sec A + \operatorname{cosec}(A)$

67. The minimum value of $2^{\sin x} + 2^{\cos x}$ is

- (1) $2^{1-\frac{1}{\sqrt{2}}}$ (2) $2^{-1+\sqrt{2}}$
(3) $2^{1-\sqrt{2}}$ (4) $2^{-1+\frac{2}{\sqrt{2}}}$

68. The value of $\cos \frac{2\pi}{7} + \cos \frac{4\pi}{7} + \cos \frac{6\pi}{7}$ is equal to

- (1) -1 (2) $-\frac{1}{2}$
(3) $-\frac{1}{3}$ (4) $-\frac{1}{4}$

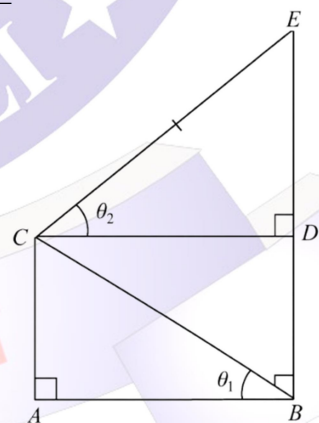
69. If $\sin \theta + \cos \theta = -\frac{1}{2}$, then $16(\sin(2\theta) + \cos(4\theta) + \sin(6\theta))$ is equal to

- (1) -27 (2) 23
(3) -23 (4) 27

70. The sum of the solutions $x \in \mathbb{R}$ of the equation $\frac{3 \cos 2x + \cos^3 2x}{\cos^6 x - \sin^6 x} = x^3 - x^2 + 6$ is

- (1) 0 (2) 1
(3) -1 (4) 3

71. In the figure, $\theta_1 + \theta_2 = \pi/2$ and $\sqrt{3} (BE) = 4(AB)$. If the area of ΔCAB is $2\sqrt{3} - 3$ unit² when θ_2/θ_1 is the largest, then the perimeter (in unit) of ΔCED is equal to _____



72. The value of $\tan 9^\circ - \tan 27^\circ - \tan 63^\circ + \tan 81^\circ$ is _____

73. Let the set of all $a \in \mathbb{R}$ such that the equation $\cos 2x + a \sin x = 2a - 7$ has a solution be $[p, q]$ and $r = \tan 9^\circ - \tan 27^\circ - \frac{1}{\cot 63^\circ} + 81^\circ$ then pqr is equal

to _____

74. Let $S = \{ \sin^2 2\theta : (\sin^4 \theta + \cos^4 \theta)x^2 + (\sin 2\theta)x + (\sin^6 \theta + \cos^6 \theta) = 0 \text{ has real roots} \}$. If α and β be the smallest and largest elements of the set S , respectively, then $3((\alpha - 2)^2 + (\beta - 1)^2)$ equals _____

75. Let $\cos(\alpha + \beta) = -1/10$ and $\sin(\alpha - \beta) = 3/8$ where $0 < \alpha < \pi/3$ and $0 < \beta < \pi/4$. If $\tan 2\alpha = \frac{3(1-r\sqrt{5})}{\sqrt{11}(s+\sqrt{5})}$, $r, s \in \mathbb{N}$, then $r + s$ is equal to _____

