GRB BOOKS

Girish Gaur

GRB KOTA QUESTION BANK PHYSICS

For

NEET

BASED ON NCERT

G. R. BATHLA & SONS
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GRB KOTA
QUESTION BANK
PHYSICS

For NEET

By :
Girish Gaur
(Kota)

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PREFACE

Through the last 20 years of my journey as an educator in the field of Engineering/Medical Entrance Exams preparation. I have come across every possible doubt, confusion and question that a student can have. It is with an aim to address each and every concern of my dear students who are preparing for NEET Exam, that this book has been designed.

The major concern of the students is how the questions will be framed to judge their indepth knowledge of subject. This book covers the various ways in which problems can be put across. One of the unique features of this book is that it takes you from a comfortable level to a challenging level in a way that you glide through it all while grasping each topic at the same time.

Level of problems in this book is slightly higher than generally asked in medical entrance exams. This is done intentionally so that after solving this book thoroughly, students gain confidence that they can easily crack physics problems asked in medical entrance exams. This book is intended to be your guide in journey of understanding and loving physics.

It is with a prayer of good luck to all my readers that I am presenting this book.

Do well. All the best !! Happy Physics solving.

I am thankful to Shri Manoj Kumar Bathla, Proprietor, G.R. Bathla & Sons and Mr. Sugam Bathla and all staff members for publishing and distributing the book across India.

Any suggestions / improvements from the readers are most welcome!

December, 2019 **Author**

Note **:** *Students and honourable teachers may feel free to give valuable suggestions on the mail* ***grbsonssuggestion@gmail.com*** *or* ***girish.gaur@yahoo.com*** *to improve the quality of the book.*

ABOUT THE AUTHOR

Girish Gaur has been guiding students preparing for various Engineering/Medical Entrance Exams for the last 20 years. This experience is unique as his focus is always on solid conceptual grooming rather than mere problem solving. Year after year, students have reaped huge benefits of his method of teaching and selection of questions which lay such a strong foundation that cracking any exam becomes not only easy but also enjoyable.

CONTENTS

1 CHAPTER

UNITS, DIMENSIONS AND BASIC MATHEMATICS

STRAIGHT OBJECTIVE TYPE

1. Which of the following combinations of three dimensionally different physical quantities P, Q, R can never be a meaningful quantity?

(a) $PQ - R$ (b) $\frac{PQ}{R}$

(c) $\frac{(P-Q)}{R}$ (d) $\frac{(PR-Q^2)}{QR}$

2. The dimensions of $\frac{a}{b}$ in the equation $P = \frac{a-t^2}{bx}$ where P is pressure, x is distance and t is time, are:

(a) $[M^2LT^{-3}]$ (b) $[MT^{-2}]$

(c) $[LT^{-3}]$ (d) $[ML^3T^{-1}]$

3. In an electron gun, emission current from the cathode is given by the equation,

$I = AT^2e^{-(B/KT)}$

[K = Boltzmann constant, A = constant]

The dimensional formula for AB^2 is same as :

(a) [KT] (b) $[IT^2]$

(c) $[IK^2]$ (d) $\left[\frac{IK^2}{T}\right]$

4. Suppose $A = B^nC^m$, where A has dimensions LT, B has dimensions L^2T^{-1}, and C has dimensions LT^2. Then the exponents n and m have the values :

(a) $\frac{2}{3}, \frac{1}{3}$ (b) 2, 3

(c) $\frac{4}{5}, -\frac{1}{5}$ (d) $\frac{1}{5}, \frac{3}{5}$

5. The velocity of a body moving in viscous medium is given by $V = \frac{A}{B}[1 - e^{-t/B}]$ where t is time, A and B are constants. Then the dimensions of A are :

(a) $[M^0L^0T^0]$ (b) $[M^0L^1T^0]$

(c) $[M^0L^0T^{-1}]$ (d) $[M^1L^1T^{-1}]$

6. A particle experiences a force $\vec{F} = Ar^2\hat{r}$, where $\hat{r}$ is the unit vector along position vector $\vec{r}$. The dimensional formula of A is :

(a) $[MLT^{-2}]$ (b) $[ML^{-2}T^{-2}]$

(c) $[ML^{-2}T^{-1}]$ (d) $[ML^{-1}T^{-2}]$

7. While solving a physics problem you perform a series of algebraic manipulations that lead to a mathematical expression for a distance. If F = Force, a = acceleration, v = velocity, m = mass, t = time, and N = a normal force, use dimensional analysis to find which of the following expressions could be **incorrect?**

(a) $\frac{vtN}{F}$ (b) $\frac{v^2}{2a}$

(c) $\frac{mva}{N}t$ (d) $\frac{ma^{-2}t^2}{N}$

8. Specific gravity has ..... dimensions in mass, ... dimensions in length and ..... dimensions in time :

(a) 0, 0, 0 (b) 0, 1, 0

(c) 1, – 3, 0 (d) 1, 1, 3

9. The dimensional equation for electric flux is, symbols have usual meaning :

(a) $[ML^3T^{-3}I^{-1}]$ (b) $[ML^{-3}T^3I^{-1}]$

(c) $[ML^3T^3I^{-1}]$ (d) $[ML^{-3}T^3I]$

10. The dimensions of σb^4 (σ = Stefan's constant and b = Wien's constant) are :

(a) $[M^0L^0T^0]$ (b) $[ML^4T^{-3}]$

(c) $[ML^{-2}T^{-3}]$ (d) none of these

11. If the speed v of a particle of mass m as function of time t is given by $v = \omega A \sin\left[\left(\sqrt{\frac{k}{m}}\right)t\right]$. Where A has dimension of length :

(a) The argument of trigonometric function must be a dimensionless quantity.

(b) Dimensional formula of ω is $[LT^{-1}]$.

(c) Dimensional formula of k is $[MLT^{-2}]$.

(d) Dimensional formula of $\sqrt{\frac{k}{m}}$ is [T].

12. Find which of the following expressions is correct? [T represents time period, 'G' is universal gravitational constant, 'M' is mass and 'a' is the radius of orbit]

(a) $T^2 = 4\pi^2 a^3$ (b) $T^2 = \frac{4\pi^2 a^2}{G}$

(c) $T^2 = \frac{4\pi^2 a^3}{GM}$ (d) $T^2 = \frac{4\pi^2 a^3}{GM^2}$

13. Which of the following functions of A and B is possibly correct if A and B possess different dimensions?

(a) $\frac{A}{e^{(A/B)}}$ (b) $\frac{B}{\log(A/B)}$

(c) $\frac{A}{B}$ (d) $\frac{B}{e^{A+B}}$

14. Assume pressure (P), length (L) and velocity (V) are fundamental quantities, then the dimensions of coefficient of viscosity (η) is :

(a) $[PL^{-1}V]$ (b) $[PLV^{-1}]$

(c) $[P^{-2}LV^{-1}]$ (d) $[PL^{-1}V^{-2}]$

15. We have a composite physical quantity defined as $Q = \frac{Fv^2}{W}$, where F is force, v is speed and W is work. Then the dimensions of Q matches with which of these :

(a) Linear momentum (b) Energy per unit area

(c) Acceleration (d) Pressure

16. A calorie is a unit of heat energy and its value is 4.18 J where 1 J = 1 kg-m^2/s^2. Suppose we use a new system of units in which unit of mass equals α kg, the unit of length equals β m and the unit of the time is γ sec. Then the value of a calorie in the new system of units :

(a) $4.18\frac{\gamma^2}{\alpha\beta^2}$ (b) $4.18\frac{\alpha\beta^2}{\gamma^2}$

(c) $4.18\frac{\gamma^2}{\alpha}$ (d) $4.18\frac{\beta^2}{\alpha\gamma^2}$

17. A gas bubble oscillates with a time period T proportional to $P^a d^b E^c$ where P is pressure, d is the density and E is the energy. The values of a, b and c are :

(a) $a = \frac{3}{2}, b = -\frac{1}{3}, c = \frac{1}{2}$

(b) $a = -\frac{5}{6}, b = \frac{1}{3}, c = \frac{1}{2}$

(c) $a = -\frac{5}{6}, b = \frac{1}{2}, c = \frac{1}{3}$

(d) $a = \frac{3}{2}, b = -\frac{1}{3}, c = \frac{1}{2}$

18. The van der Waals' equation for n moles of a real gas is : $\left(P + \frac{n^2 a}{V^2}\right)(V - nb) = nRT$ where P is the pressure, V is the volume, T is the absolute temperature, R is the molar gas constant and a, b are van der Waals' constants. Which of the following have the same dimensions as those of PV?

(a) nRT (b) $\frac{a}{V}$

(c) Pb (d) $\frac{ab}{V^2}$

19. If the unit of length be doubled then the numerical value of the universal gravitation constant G will become (with respect to present value) :

(a) double (b) half

(c) 8 times (d) $\frac{1}{8}$ times

20. If instead of mass, length and time as fundamental quantities, we choose velocity, acceleration and force as fundamental quantities and express their dimensions by V, A and F respectively, then the dimensions of Young's modulus will be expressed as:

(a) $[FA^2V^{-4}]$ (b) $[F^2V^{-1}A]$

(c) $[FA^2V^{-1}]$ (d) $[FAV^{-2}]$

21. $M^{-1}L^{-2}T^3\theta$ are dimensions of :

(a) coefficient of thermal conductivity

(b) coefficient of viscosity

(c) modulus of rigidity
(d) thermal resistance

22. The force on a charged particle depends on permittivity ε, resistance R, gravitational constant G and voltage V as $F = k\varepsilon^a R^b G^c V^d$ where k is the numerical constant. Find the values of $a + b + c + d$:

(a) $\frac{3}{5}$ (b) $\frac{4}{5}$
(c) $\frac{7}{5}$ (d) $\frac{8}{5}$

23. Consider the equation $\frac{d}{dt}[\int \vec{F} \cdot d\vec{s}] = A[\vec{F} \cdot \vec{P}]$. Then dimensions of A will be (where $\vec{F} \equiv$ force, $d\vec{s} \equiv$ small displacement, $t \equiv$ time and $\vec{P} \equiv$ linear momentum) :

(a) $[M^0 L^0 T^0]$ (b) $[M^1 L^0 T^0]$
(c) $[M^{-1} L^0 T^0]$ (d) $[M^0 L^0 T^{-1}]$

24. A laser light pulse beamed at moon takes 2.56 s to return to earth. Radius of lunar orbit around earth is :

(a) 3.84×10^5 km (b) 7.68×10^5 km
(c) 1.92×10^5 km (d) 7.68×10^4 km

25. When one computes the square root of the ratio of the permeability of free space to the permittivity of free space, one obtains $\sqrt{\frac{\mu_0}{\epsilon_0}} = 377$. What is the unit of this quantity?

(a) Farad (b) Joule
(c) Volt (d) Ohm

26. The ratio of 3 MJ (mega joule) energy and 2 ns (nano second) is given as :

(a) 1.5×10^3 W (b) 1.5×10^{15} N
(c) 1.5×10^3 N (d) 1.5×10^{15} W

27. The SI standard of measurement for which of the following fundamental quantities is not based on a universally constant measurement?

(a) time (b) length
(c) mass (d) luminous intensity

28. In a certain system of units, 1 unit of time is 5 sec, 1 unit of mass is 20 kg and 1 unit of length is 10 m. In this system, one unit of power will correspond to :

(a) 16 watts (b) $\frac{1}{16}$ watt
(c) 25 watts (d) none of these

29. In two different systems of units an acceleration is represented by the same number, while a velocity is represented by numbers in the ratio 1 : 3. The ratios of unit of length and time are respectively :

(a) $\frac{1}{3}, \frac{1}{9}$ (b) $\frac{1}{9}, \frac{1}{3}$
(c) 1, 1 (d) none of these

30. Suppose we employ a system in which the unit of mass equals 100 kg, the unit of length equals 1 km and the unit of time 100 sec and call the unit of energy as eluoj (joule written in reverse order), then what is the relation between eluoj and joule?

(a) 1 eluoj = 10^4 joule (b) 1 joule = 10^4 eluoj
(c) 1 eluoj = 10^3 joule (d) 1 joule = 10^3 eluoj

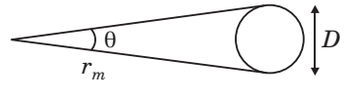
31. If P represents radiation pressure, C represents the speed of light and Q represents radiation energy striking a unit area per sec, where x, y, z are non-zero integers such that $(P^x Q^y C^z)$ is dimensionless. Find the value of x, y and z :

(a) $x = -1, y = -1, z = 1$ (b) $x = 1, y = -1, z = 1$
(c) $x = -1, y = -1, z = -1$ (d) $x = 1, y = 1, z = 1$

32. If K represents kinetic energy, V represents velocity and T represents time, and these are chosen as the fundamental units then, the dimensional formula of surface tension is : (Given : surface tension is force per unit length)

(a) $[KV^{-2} T^{-2}]$ (b) $[KV^{-1} T^{-2}]$
(c) $[K^2 V^{-1} T^{-3}]$ (d) $[KV^{-2} T^{-1}]$

33. The angle subtended by the moon's diameter at a point on the earth is about 0.50°. Use this and the fact that the moon is about 384000 km away to find the approximate diameter of the moon :



(a) 192000 km (b) 3350 km
(c) 1600 km (d) 1920 km

34. A plumber steps out of his truck, walks 60 m east and 35 m south and then takes an elevator, 12 m down to the basement of a building where a bad leak is occurring. Assume x axis is east ; y-axis is north and z-axis is up, displacement of plumber is expressed conventionally as :

(a) $60\hat{i} - 35\hat{j} - 12\hat{k}$ (b) $-60\hat{i} + 35\hat{j} - 12\hat{k}$
(c) $-60\hat{i} - 35\hat{j} + 12\hat{k}$ (d) $60\hat{i} - 35\hat{j} + 12\hat{k}$

35. Sum of two unit vectors is a unit vector. What is magnitude of their vector difference?

(a) $\sqrt{2}$ (b) $\sqrt{3}$

(c) $\frac{1}{\sqrt{2}}$ (d) $\sqrt{5}$

36. Which of the following is not a vector quantity?

(a) Force (b) Current

(c) Velocity (d) Torque

37. A force of 6 N and another of 8 N can be applied together to produce the effect of a single force of :

(a) 1 N (b) 11 N

(c) 15 N (d) 20 N

38. Which of the following forces cannot be a resultant of 5 N force and 7 N force?

(a) 2 N (b) 10 N

(c) 14 N (d) 5 N

39. A vector $\vec{A}$ is directed along 30° west of north direction and another vector $\vec{B}$ along 15° south of east. Their resultant cannot be in ..... direction.

(a) North (b) East

(c) North-East (d) South

40. A force $\vec{F} = 6\hat{i} - 8\hat{j} + 10\hat{k}$ newton produces acceleration 1 m/s^2 in a body .The mass of the body is (in kg) :

(a) $6\hat{i} - 8\hat{j} + 10\hat{k}$ (b) 100

(c) $10\sqrt{2}$ (d) 10

41. A force of 6 N and a force of 10 N can combine to form a resultant with a magnitude of which of the following?

(a) 0 (b) 2 N

(c) 8 N (d) 20 N

42. Two vector $\vec{a}$ and $\vec{b}$ add to give a resultant $\vec{c} = \vec{a} + \vec{b}$. In which of these cases angle between $\vec{a}$ and $\vec{b}$ is maximum? (a, b, c represent the magnitudes of respective vectors)

(a) $c = a + b$

(b) $c^2 = a^2 + b^2$

(c) $c = a - b$

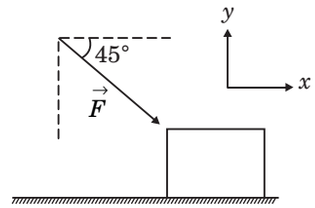
(d) Can not be determined

43. $\vec{a} = 3\hat{i} + 5\hat{j}$, $\vec{b} = 2\hat{i} + 7\hat{j}$, $\vec{c} = \hat{i} + 9\hat{j}$ which of the following combinations is in the same direction as $\vec{a} + \vec{b} - \vec{c}$?

(a) $2\vec{a} + \vec{b}$ (b) $2\vec{a} - \vec{b}$

(c) $\vec{a} - 2\vec{b}$ (d) None of these

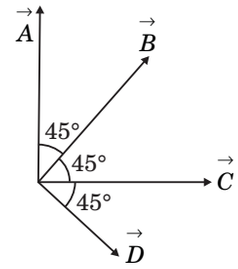
44. A person pushes a box kept on a horizontal surface with force of 100 N. In unit vector notation force $\vec{F}$ can be expressed as :



(a) $100\,(\hat{i} + \hat{j})$ (b) $100\,(\hat{i} - \hat{j})$

(c) $50\sqrt{2}\,(\hat{i} - \hat{j})$ (d) $50\sqrt{2}\,(\hat{i} + \hat{j})$

45. Four vectors ($\vec{A}, \vec{B}, \vec{C}, \vec{D}$) all have the same magnitude and lie in a plane. The angle between adjacent vectors is 45° as shown. Which of the following equation is incorrect?



(a) $\vec{A} - \vec{C} = -\sqrt{2}\vec{D}$ (b) $\vec{B} + \vec{C} - \sqrt{2}\vec{C} = 0$

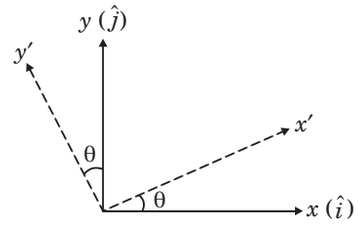
(c) $\vec{A} + \vec{B} = \vec{B} + \vec{D}$ (d) $\frac{(\vec{A} + \vec{C})}{\sqrt{2}} = \vec{B}$

46. There are four forces $\vec{F}_1, \vec{F}_2, \vec{F}_3, \vec{F}_4$ acting on particle such that particle is in equilibrium. Suddenly $\vec{F}_4$ vanishes. The resultant of remaining forces acting on the particle is :

(a) $\vec{F}_1 + \vec{F}_2$ (b) $F_1 + F_2 + F_3$

(c) $\vec{F}_1 + \vec{F}_2 + \vec{F}_3$ (d) $-\vec{F}_4$

47. A co-ordinate system consisting of x-y axis, is rotated by an angle θ in anticlockwise direction in the same plane. The unit vector along new set of axes, $\hat{x}'$ and $\hat{y}'$ are respectively :



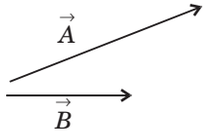
(a) $\cos\theta\, i$ and $\sin\theta\, j$

(b) $\cos\theta\, i + \sin\theta\, j$ and $-\sin\theta\, i + \cos\theta\, j$

(c) $\cos\theta\, i + \sin\theta\, j$ and $\sin\theta\, i + \cos\theta\, j$

(d) $\sin\theta\, i + \cos\theta\, j$ and $\cos\theta\, i + \sin\theta\, j$

48. Two vectors $\vec{A}$ and $\vec{B}$ have magnitudes 2 and 1 respectively. If the angle between $\vec{A}$ and $\vec{B}$ is 60°, then which of the following vectors may be equal to $\frac{\vec{A}}{2} - \vec{B}$?



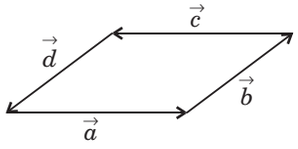
(a) 

(b) 

(c) 

(d) 

49. On the basis of given diagram, choose the pair of vectors which have an acute angle between them :



(a) $\vec{a}$ and $\vec{c}$ (b) $\vec{a}$ and $\vec{d}$

(c) $\vec{b}$ and $\vec{c}$ (d) $\vec{c}$ and $\vec{d}$

50. The projection of the vector $3\hat{i} + 4\hat{k}$ on y-axis is :

(a) zero (b) 5

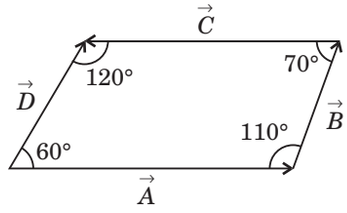
(c) 4 (d) 3

51. The following set represents magnitudes of three vectors. Which set of vectors can never give a zero vector on addition?

(a) 3, 4, 5 (b) 2, 1, 3

(c) 12, 10, 23 (d) 13, 5, 12

52. In the given figure



(a) angle between $\vec{A}$ and $\vec{B}$ is 110°

(b) angle between $\vec{C}$ and $\vec{D}$ is 60°

(c) angle between $\vec{B}$ and $\vec{C}$ is 110°

(d) angle between $\vec{B}$ and $\vec{C}$ is 70°

53. An object moves in the xy plane with an acceleration that has a positive x component. At $t = 0$ the object has a velocity given by $\vec{v} = 3\hat{i} + 0\hat{j}$. What can be concluded about the y component of the acceleration?

(a) The y component must be positive and constant.

(b) The y component must be negative and constant.

(c) The y component must be zero.

(d) Nothing at all can be concluded about the y component.

54. A bird starts from (1, 0, 0) in the direction $(2\hat{i} + 3\hat{j} - 6\hat{k})$ with a speed 21 m/s for 5 sec, then along the direction $(3\hat{i} + 4\hat{j} + 5\hat{k})$ with a speed $5\sqrt{2}$ m / s for 5 sec. Find the final displacement of the bird so that is reaches the origin.

(a) $30\hat{i} + 45\hat{j} - 4\hat{k}$ (b) $-45\hat{i} - 65\hat{j} + 65\hat{k}$

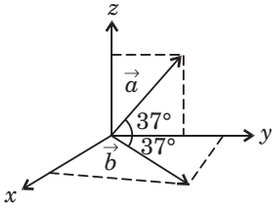
(c) $-46\hat{i} - 65\hat{j} + 65\hat{k}$ (d) $46\hat{i} - 65\hat{j} - 65\hat{k}$

55. Given that $\vec{P} + \vec{Q} = \vec{R}$ and $\vec{R} \perp \vec{P}$. What is the angle between $\vec{P}$ and $\vec{Q}$ if $|\vec{P}| = |\vec{R}|$?

(a) $\frac{3\pi}{4}$ rad. (b) $\frac{\pi}{4}$ rad.

(c) π rad. (d) $\frac{\pi}{2}$ rad.

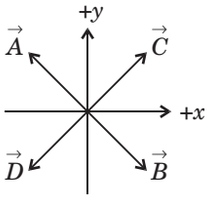
56. Figure shows two vectors $\vec{a}$ (in y-z plane) and $\vec{b}$ (in x-y plane) such that $|\vec{a}| = |\vec{b}| = 5$ units. What is angle between $\vec{a}$ and $\vec{b}$?



(a) $\theta = \cos^{-1}\frac{12}{25}$ (b) $\theta = \cos^{-1}\frac{16}{25}$

(c) $\theta = \cos^{-1}\frac{9}{25}$ (d) $\theta = 90°$

57. You have ring balanced at the center of the table by three forces $\vec{F}_1$, $\vec{F}_2$ and $\vec{F}_3$. The forces $\vec{F}_1$ and $\vec{F}_2$ have components.



$F_{1x} = 10$ N $F_{1y} = -50$ N

$F_{2x} = -40$ N $F_{2y} = 100$ N

The force $\vec{F}_3$ is required to make the ring stationary at the center of the table. Which one of the 4 vectors in the diagram could represent $\vec{F}_3$?

(a) $\vec{A}$ (b) $\vec{B}$

(c) $\vec{C}$ (d) $\vec{D}$

58. If $\vec{a} = 2\hat{i} + 3\hat{j} + 6\hat{k}$ and $\vec{b} = 3\hat{i} + 4\hat{j}$,

then $\frac{\text{projection of } \vec{a} \text{ on } \vec{b}}{\text{projection of } \vec{b} \text{ on } \vec{a}} =$

(a) $\frac{7}{5}$ (b) $\frac{5}{7}$

(c) $\frac{4}{9}$ (d) none of these

59. A car is moving in east direction. It takes a right turn and moves along south direction without change in its speed. What is the direction of average acceleration of the car?

(a) North east (b) South east

(c) North west (d) South west

60. A man moves in an open field such that after moving 10 m in a straight line, he makes a sharp turn of 60° to his left. Find the total displacement of the man just after 7 such turns :

(a) 10 m (b) 20 m

(c) 70 m (d) 30 m

61. A particle is moving westward with a velocity $\vec{v}_1$ = 5 m/s. Its velocity changed to $\vec{v}_2$ = 5 m/s northward. The change in velocity vector ($\Delta\vec{v} = \vec{v}_2 - \vec{v}_1$) is :

(a) $5\sqrt{2}$ m/s towards north east

(b) 5 m/s towards north west

(c) zero

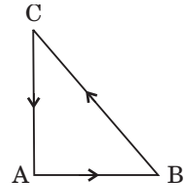
(d) $5\sqrt{2}$ m/s towards north west

62. Consider east as positive x-axis, north as positive y-axis. A girl walks 10 m east first time then 10 m in a direction 30° west of north for the second time and then third time in unknown direction and magnitude so as to return to her initial position. What is her third displacement in unit vector notation?

(a) $-5\hat{i} - 5\sqrt{3}\hat{j}$ (b) $5\hat{i} - 5\sqrt{3}\hat{j}$

(c) $-5\hat{i} + 5\sqrt{3}\hat{j}$ (d) She can not return

63. Three forces start acting simultaneously on a particle moving with velocity $\vec{v}$. These force are represented in magnitude and direction by the three sides of a triangle ABC (as shown). The particle will now move with velocity :



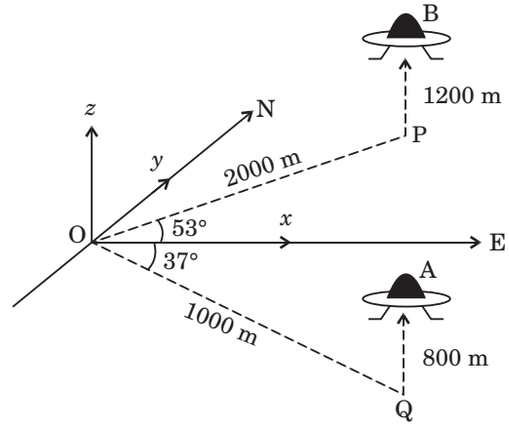
(a) $|v|$ in the direction of the largest force BC

(b) $\vec{v}$, remaining unchanged

(c) less than $\vec{v}$

(d) greater than $\vec{v}$

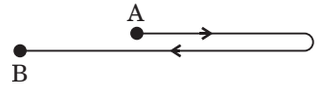
64. Personnel at an air post control tower track a UFO. at 11 : 02 am it was located at position A and at 11 : 12 am it was located at position B. Vector OP and OQ are in xy-plane, PB and QA are perpendicular to xy-plane. What is displacement vector of UFO?



(a) $1200\hat{i} + 1000\hat{j} + 800\hat{k}$ (b) $2000\hat{i} + 2200\hat{j} + 2000\hat{k}$

(c) $400\hat{i} + 1000\hat{j} + 400\hat{k}$ (d) $400\hat{i} + 2200\hat{j} + 400\hat{k}$

65. A car goes from A to B along the path shown with a constant acceleration 'a'.



Now, according to choice of co-ordinate system of students :

Student-1 : says that acceleration is negative, final displacement is positive and initial velocity is positive.

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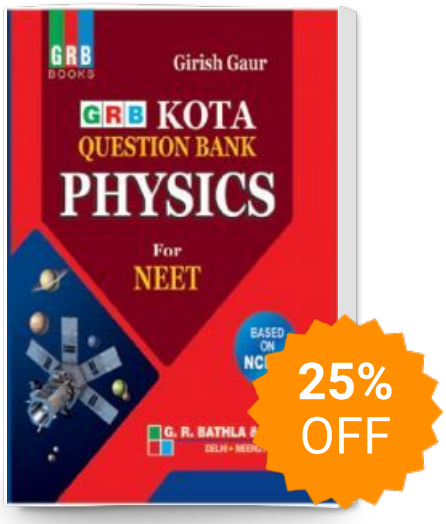

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