MULTIPLE CHOICE QUESTIONS (MCQs)

(1) **Addition of a vector $\vec{A}$ to a vector $-\vec{B}$ is equivalent to:**
* Subtraction of vectors $\vec{A}$ and $\vec{B}$ * Division of vectors $\vec{A}$ and $\vec{B}$
* Resolution of vectors $\vec{A}$ and $\vec{B}$ * Multiplication of vectors $\vec{A}$ and $\vec{B}$

(2) **A vector is a physical quantity which has:**
* Magnitude * Direction * Both of them * None of these

(3) **Which of the following is scalar quantity:**
* Velocity * Speed * Force * Momentum

(4) **If $\vec{A} \times \vec{B} = \vec{C}$ points along Z – axis then the vector $\vec{A}$ and $\vec{B}$ must lie in:**
* yz – plane * xy-plane * xz-plane * None of these

(5) **Kinetic energy is a quantity which is:**
* Scalar * Vector
* Both Scalar and Vector * None of these

(6) **Vectors are added according to:**
* Left hand rule * Right hand rule * Head-to-tail rule * None of these

(7) **$\hat{k}.(\hat{i} \times \hat{j})$ has value:** * Zero * One * $\hat{j}$ * $\hat{k}$

(8) **To subtract a given vector from another its_____ vector is added to the other one:**
* Double * Half * Negative * Positive

(9) **A null vector has:**
* No direction * No magnitude * No existence * Neither

(10) **A vector which has magnitude one is called:**
* Null vector * Unit vector * Negative vector * Resultant vector

(11) **A vector which has magnitude zero is called:**
* Unit vector * Negative vector * Null vector * None of these

(12) **If a vector quantity is divided by its magnitude then the vector obtained is called:**
* Unit vector * Position vector * Null vector * Free vector

(13) **The angle between two rectangular components of a vector is:**
* 0° * 30° * 40° * 90°

(14) **A vector in space has:**
* 1 component * 2 components * 3 components * 4 components

(15) **The minimum number of unequal forces when resultant will be zero:**
* 5 * 3 * 4 * 2

(16) **The sum of two or more vectors is equal to a single vector which is called:**
* A null vector * A unit vector * A negative vector * A resultant vector

(17) **When a certain vector is multiplied by a – ve number the direction changes by:**
* 90° * 180° * 120° * 60°

(18) **Two perpendicular vectors having magnitudes of 4 unit and 3 unit are added. Their resultant has the magnitude of:**
* *7 Unit* * *12 Unit* * *25 Unit* * *5 Unit*

(19) ***The magnitude of vector $\vec{A} = A\hat{x}i + A\hat{y}j + A\hat{z}k$:***
* $A = Ax + Ay$ * $A = (Ax)^2 + (Ay)^2$
* $A = \sqrt{(Ax)^2 + (Ay)^2 + (Az)^2}$ * $A\cos\theta + A\sin\theta$

(20) **If a force of 10N makes an angle of 30° with x – axis, its x – component is given by:**
* 0.866N * 8.66N * 86.6N * 89.2N

(21) If a force of 10N makes an angle of 60° with x – axis, its y – component is given by:

* 0.866N * 8.66N * 86.6N * 89.2N

(22) Two forces of magnitudes F_1 and F_2 act on a body at right angle to each other, the magnitude of resultant:

* $F_1 + F_2$ * $\sqrt{F_1 + F_2}$ * $\sqrt{(F_1)^2+(F_2)^2}$ * $\sqrt{F_1 - F_2}$

(23) Two forces of magnitudes F_1 and F_2 act on a body at an angle θ, to each other the magnitude of resultant force is:

* $\sqrt{(F_1)^2+(F_2)^2}$ * $\sqrt{\frac{(F_1)^2+(F_2)^2}{2}}$

* $\sqrt{(F_1)^2+(F_2)^2+\frac{1}{2}F_1F_2}$ * $\sqrt{F_1^2+F_2^2+2F_1F_2\cos\theta}$

(24) The resultant of force 4N and 3N force acting on a body at right angle to each other is:

* Zero * 5 N * 7 N * 15 N

(25) If two forces of the same magnitude F are acting at an angle 120° with each other, the magnitude of their resultant will be:

* 2F * 0 * 0.5 F * F

(26) The x and y component vectors are IN each, the angle made by the resultant vector is:

* 0° * 30° * 45° * 90°

(27) If two forces of the same magnitude F make an angle of 180° with each other, their resultant is:

* 2 F * Zero * 0.5 F * F

(28) The position vector of a point in xz – plane is given by:

* $\vec{r}=x\hat{i}+y\hat{j}+Z\hat{k}$ * $\vec{r}=x\hat{i}+y\hat{j}$ * $\vec{r}=x\hat{i}+Z\hat{k}$

(29) The position vector of a point in xy – plane:

* $\vec{r}=x\hat{i}+z\hat{k}$ * $\vec{r}=x\hat{i}+y\hat{j}$ * $\vec{r}=y\hat{j}+Z\hat{k}$

(30) When $|\vec{A}+\vec{B}|=|\vec{A}-\vec{B}|$, the angle between the vectors $\vec{A}$ and $\vec{B}$ is:

* Zero * 45° * 90° * None of these

(31) If $\vec{A}.\vec{B}=0$ and $\vec{A}\times\vec{B}=0$ and $\vec{A}\neq 0$, the vector $\vec{B}$ is:

* equal to $\vec{A}$ * Zero * Perpendicular to $\vec{A}$ * Parallel to $\vec{A}$

(32) If $\vec{A}.\vec{B}=0$ and $\vec{A}\times\vec{B}=1$, then:

* Two vectors are parallel * Two vectors are in opposite direction
* Two vectors perpendicular * Non of these

(33) $\vec{A}.\vec{B}$ gives:

* Projection of $\vec{A}$ on $\vec{B}$ * Projection of $\vec{B}$ on $\vec{A}$
* Area of a parallelogram * None of these

(34) If $\vec{F}=4\hat{i}-2\hat{j}$ and $\vec{d}=3\hat{i}+4\hat{j}$, the work done will be:

* 4 joules * 8 joules * 2 joules * 12 joules

(35) The dot product of a unit vector $\hat{i}$ and $\hat{k}$ is:

* Zero * 1 * –1 * $\hat{j}$

(36) If $\vec{a}.\vec{b}=0$ when $\vec{a}\neq 0, \vec{b}\neq 0$, the vectors are:

* Parallel * Opposite * Perpendicular * None of these

(37) The vectors $\vec{A}$ and $\vec{B}$ are parallel if:

* $\vec{A}.\vec{B}=0$ * $\vec{A}\times\vec{B}=0$ * $\vec{A}=\vec{B}$ * $|\vec{A}|=|\vec{B}|$

(38) If $\vec{A}$ and $\vec{B}$ are two vectors then:

* $\vec{A}\times\vec{B}=\vec{B}\times\vec{A}$ * $\vec{A}.\vec{B}=-\vec{B}.\vec{A}$ * $\vec{A}.\vec{B}=\vec{B}.\vec{A}$ * $\vec{A}.\vec{B}=(\vec{B}.\vec{A})$

(39) The dot product of vector $\vec{A}$ with itself is equal to:

* A * A * A^2 * $2\vec{A}$

(40) If $\mathbf{A}=A\hat{i}$ and $\mathbf{B}=B\hat{j}$ then :

* $\vec{A}.\vec{B}=A$ * $\vec{A}.\vec{B}=B$ * $\vec{A}.\vec{B}=0$ * $\vec{A}.\vec{B}=A^2$

(41) If the unit vector $\hat{i}$ and $\hat{j}$ are perpendicular to each other then:

* $\hat{i}\times\hat{j}=0$ * $\hat{i}\cdot\hat{j}=0$ * $\hat{i}\cdot\hat{j}=1$ * $\hat{j}\times\hat{i}=0$

(42) Which of the following is correct?

* $\hat{i}\cdot\hat{j}=\hat{j}\cdot\hat{j}=\hat{k}\cdot\hat{k}$ * $\hat{i}\cdot\hat{i}=\hat{j}\cdot\hat{j}=\hat{k}\cdot\hat{k}=0$
* $\hat{i}\cdot\hat{i}=\hat{j}\cdot\hat{j}=\hat{k}\cdot\hat{k}=1$ * $\hat{i}\cdot\hat{i}=\hat{i}\times\hat{i}$

(43) For vector $\vec{V}$:

* $\vec{V}\cdot\vec{V}=0$ * $\vec{V}\times\vec{V}=V^2$ * $\vec{V}\times\vec{V}=\vec{V}$ * $\vec{V}.\vec{V}=V^2$

(44) If $\vec{A}=Ax\hat{i}+Ay\hat{j}+Az\hat{k}$, $\vec{B}=Bx\hat{i}+By\hat{j}+Bz\hat{k}$ then:

* $\vec{A}\cdot\vec{B}=Ax\,Bx+Ay\,By+Az\,Bz$ * $\vec{A}\cdot\vec{B}=A_xB_y+A_yB_x+A_zB_z$
* $\vec{A}\cdot\vec{B}=AB+A_xB_x+A_zB_z$ * $\vec{A}\cdot\vec{B}=0$

(45) The vector product of $\vec{A}$ and $\vec{B}$ is perpendicular to the plane of:

* $\vec{A}\cdot\vec{B}$ * $\vec{B}\cdot\vec{A}$ * $\vec{A}\times\vec{B}$ * $\vec{A}-\vec{B}$

(46) The area of a parallelogram formed by two vectors $\vec{A}$ and $\vec{B}$ is given by:

* $\frac{1}{2}(\vec{A}\cdot\vec{B})$ * $|\vec{A}\times\vec{B}|$ * $\frac{1}{2}|\vec{A}\times\vec{B}|$ * $\vec{A}\cdot\vec{B}$

(47) If $\hat{i}$, $\hat{j}$ and $\hat{k}$ are the unit vectors along x, y and z axes respectively, then $\hat{k}\times\hat{j}=$:

* $\hat{i}$ * $-\hat{i}$ * 1 * -1

(48) If two sides of a triangle are represented by $\vec{A}$ and $\vec{B}$ its area is given by:

* $\frac{1}{2}(\vec{A}\cdot\vec{B})$ * $\frac{1}{2}|\vec{A}\times\vec{B}|$ * $|\vec{A}.\vec{B}|$ * $|\vec{A}\times\vec{B}|$

(49) $\hat{j}\times\hat{j}$ is equal to: * j^2 * $\hat{j}$ * One * Zero

(50) $\hat{i}\times(\hat{j}\times\hat{k})$ is equal to:

* One * Zero * $\hat{k}$ * $\hat{j}$

(51) $\hat{k}\times(\hat{i}\times\hat{j})$ has value:

* Zero * One * $\hat{i}$ * $\hat{j}$

(52) $\hat{j}\cdot(\hat{j}\times\hat{k})$ has value:

* Zero * One * $\hat{i}$ * $\hat{k}$

(53) $\hat{j}\cdot(\hat{k}\times\hat{i})$ has value:

* Zero * One * $\hat{i}$ * $\hat{k}$

ANSWER KEY

1. Subtraction of vector	**2.** Both of these	**3.** Speed
4. XY – plane	**5.** Scalar	**6.** Head to tail rule
7. One	**8.** Negative	**9.** Neither
10. A Unit Vector	**11.** Null Vector	**12.** Unit Vector
13. 90°	**14.** 3 Components	**15.** 3
16. A resultant Vector	**17.** 180°	**18.** 5 Unit
19. $A = \sqrt{(Ax)^2+(Ay)^2+(Az)^2}$	**20.** 8.66N	**21.** 8.66N
22. $\sqrt{(F_1)^2+(F_2)^2}$	**23.** $\sqrt{F_1^2+F_2^2+2F_1F_2\cos\theta}$	**24.** 5N
25. F	**26.** 45°	**27.** Zero
28. $\vec{\gamma} = x\hat{i} + z\hat{k}$	**29.** $\vec{\gamma} = x\hat{i} + y\hat{j}$	**30.** 90°
31. Zero	**32.** Two vector perpendicular	**33.** Proj. of $\vec{B}$ on $\vec{A}$
34. 4 Joule	**35.** Zero	**36.** Perpendicular
37. $\vec{A} \times \vec{B} = 0$	**38.** $\vec{A} \cdot \vec{B} = \vec{B} \cdot \vec{A}$	**39.** A^2
40. $\vec{A} \cdot \vec{B} = 0$	**41.** $\hat{i} \cdot \hat{j} = 0$	**42.** $\hat{i} \cdot \hat{j} = \hat{j} \cdot \hat{j} = \hat{k} \cdot \hat{k} = 1$
43. $\vec{V} \cdot \vec{V} = V^2$	**44.** $\vec{A} \cdot \vec{B} = Ax\,Bx + Ay\,By + Az\,Bz$	**45.** $\vec{A} \times \vec{B}$
46 $\lvert\vec{A} \times \vec{B}\rvert$	**47.** $-\hat{i}$	**48.** $\frac{1}{2}\lvert\vec{A} \times \vec{B}\rvert$
49. Zero	**50.** Zero	**51.** Zero
52. Zero	**53.** One	