Old Exam Questions Ch. 3

T072:

Q5.Vectors $\vec{a}$, $\vec{b}$, and $\vec{c}$ are related through equations $\vec{a}+\vec{b}=\vec{c}$ and $\vec{a}-\vec{b}=5.0\,\vec{c}$. If $\vec{c}=3.0\,\hat{i}+4.0\,\hat{j}$, what is the magnitude of vector $\vec{a}$? (Ans: 15)

Q6. Three vectors $\vec{F}$, $\vec{v}$ and $\vec{B}$ are related through $\vec{F}=5.0\left(\vec{v}\times\vec{B}\right)$. If vector $\vec{v}=3.0\,\hat{i}-5.0\,\hat{j}$ and $\vec{B}=-2.0\,\hat{k}$, then vector $\vec{F}$ is: (Ans: $50\,\hat{i}+30\,\hat{j}$)

Q7. A vector $\vec{A}$ of magnitude 20 is added to a vector $\vec{B}$ of magnitude 25. The magnitude of the vector $\vec{A}+\vec{B}$ can be: (Ans: 12)

Q8. Vectors $\vec{F}$ and $\vec{G}$ are defined as $\vec{F}=3.0\,\hat{i}+4.0\,\hat{j}$, and $\vec{G}=-\hat{i}+\hat{j}$. Find the component (projection) of vector $\vec{G}$ along the direction of vector $\vec{F}$.(Ans: 0.20)

T071:

Q8**.** Two vectors are given by: $\vec{P}=-1.5\hat{i}+2.0\,\hat{j}$, $\vec{Q}=1.0\,\hat{j}$. The angle that the vector $2\vec{P}-\vec{Q}$ makes with the **positive** *x*-axis is: (A: 135°)

Q9**.** A man walks 5.0 km due North, then 13 km 22.6° South of East, and then 12 km due West. The man is finally at: (Ans: where he started)

T062:

Q7. *A* and *B* are two perpendicular vectors: *A*=3.0 *i* and *B=2.0 j* The magnitude of is: *A-2B* (Ans: 5.0*)*

Q8. The angle between vector *A=3.00 i+ 4.00j* and the negative *y*-axis is: (A: 143°)

Q9. Three vectors are given as: $A=-3.0i;\ B=-5.0\,k$ *and* $C=2.0\,j$. The value of $A.(B \times C)$ is: (Ans -30)

T061:

Q6. A vector in the xy plane has a magnitude of 25 m and an *x* component of +12 m and a positive *y* component. The angle it makes with the positive y axis is: (Ans: 29°)

Q7. If $A=(2.0\,i-3.0j)m$ and $B=(1.0i-2.0j)m$, then $A-2B=$ (Ans: (1.0j) m)

Q8. Two vectors and *A and B* have magnitudes of 10 m and 15 m respectively. The angle between them is 65°. The component (projection) of *B* along *A* is: (Ans: 6.3 m)

T052:

Q6. If $A=i+j$ and $B=i-j$ then: (Ans: the angle between A and B must be 90°)

Q7. Let $A=2.0i+3.0\,k$ and $B=2.0\,i+k$ .The vector $D=(A-B)xA$ is: (Ans: -8.0 *j*)

Q8. In Fig 1, A(12m , 60°) and B=(8m ,300°). Then x component of (*A-B)* is: (Ans: 2 m)

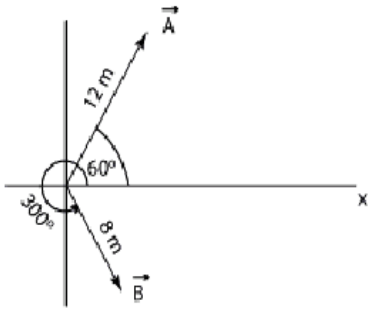

Figure 1

T051:

Q6. Three vectors *A, B* , and *C* are such that: $C=A+B$, $B=5i$ and $C=5j$. Find the angle between *A* and B (Ans: 135°)

Q7. A man walks 4.65 km West, then 12.7 km in the direction 30° West of North and finally 11.0 km due East. The man is now at (Ans: 11.0 km due North)

Q8. If vector *A* has the magnitude of 3.0 m and makes an angle 30° with the +x-axis, then the vector 2*B* =-A is: (Ans: 5.2 i –3.0j)

T042:

Q7. Two vectors A and B are shown in Fig 1. Each vector has a magnitude of 5.0 m. Find the magnitude of the resultant vector R = A + B and the angle (theta) between R and the positive x-axis (counter clockwise.(Ans: magnitude = 7.1 m, theta = 90 degrees)

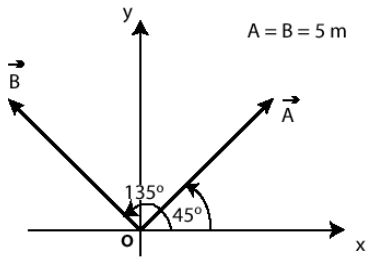

Figure 1

Q8 Vector A has components Ax = 4.0, Ay = -3.0 . Vector B has components Bx = 8.0, By = 6.0. Find the angle between the two vectors. (Ans: 74 degrees)

Q9# Three vectors are A =1.00i + 2.00 j -3.00 k , B = 3.00 k and C = 6.00 i - 7.00 j. Find 2C.(A X B) . (Ans: 114)

T041:

Q7: Two vectors are given as: A = -3.0 i + 5.0 j + 4.0 k and B = 4.0 i + 5.0 j + 3.0 k, where i,j and k are the unit vectors in the positive x, y and z directions. Find the angle between the vectors A and B. (Ans: 60 degrees)

Q8 In the cross product F = v x B, take v = 2.0 i, F = 6.0 j and the x-component of vector B equals zero.What then is B in unit-vector notation. (Ans: -3.0 k)

Q9 Two displacement vectors A and B have equal magnitudes of 10 m. Vector A is along the +y axis and vector B makes 45 degrees counterclockwise with +x axis. Find the vector C such that B + C = 2A . (Ans: C = -7 i + 13 j)

T031:

Q6 The angle between the two vectors A = 2 i + 4 j and B = 4 i - 2 j is: (Ans: 90 degrees)

Q7As shown in Fig. 3, a block moves down on a 45-degree inclined plane of 2.5 m length, then horizontally for another 2.5 m, and then falls down vertically a height of 2.5 m. Find the magnitude and direction of the resultant displacement vector of the block. (Ans: 6.0 m and 45 degrees below horizontal axis)

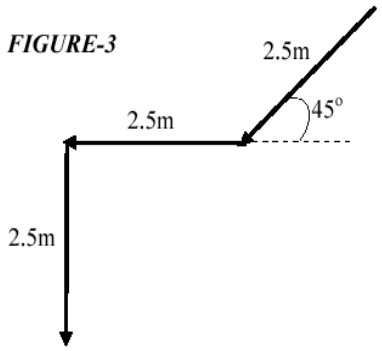

FIGURE-3

Q8 Given the vectors A = 3 j + 6 k , B = 15 i + 21 k. Find the magnitude of vector C that satisfies equation 2A + 3C - B = 0. (Ans: 6.16)