1 Vectors Take-Home Exam

(1) **1**

MULTIPLE CHOICE | marked out of 1.0 | penalty 0 | One answer only | Shuffle

Which of the following is a vector quantity?

a. Mass
b. Speed
c. Displacement ✓
d. Temperature

(2) **2**

MULTIPLE CHOICE | marked out of 1.0 | penalty 0 | One answer only | Shuffle

Two vectors A and B are added together. Which of the following statements is always true?

a. The resultant has a magnitude equal to the sum of the magnitudes of A and B.
b. The resultant has a direction that bisects the angle between A and B.
c. The resultant is always larger than either A or B.
d. The resultant depends on both the magnitudes and directions of A and B. ✓

(3) **3**

MULTIPLE CHOICE | marked out of 1.0 | penalty 0 | One answer only | Shuffle

The dot product of two perpendicular vectors is always:

a. Zero ✓
b. Positive
c. Negative
d. Equal to their magnitudes multiplied together

(4) **4**

MULTIPLE CHOICE | marked out of 1.0 | penalty 0 | One answer only | Shuffle

If a vector A has components $Ax = 3$ and $Ay = 4$, what is the magnitude of A?

a. 3
b. 4
c. 5 ✓
d. 7

(5) **5**

MULTIPLE CHOICE | marked out of 1.0 | penalty 0 | One answer only | Shuffle

Which of the following represents the unit vectors in three-dimensional Cartesian coordinates?

a. a, b, c
b. i, j, k ✓
c. x, y, z
d. r, θ, ϕ

(6) **6**

NUMERICAL | marked out of 1.0 | penalty 0

A vector A has components Ax = 6 and Ay = 8. Calculate its magnitude.

- 10 (0%)

(7) **7**

NUMERICAL | marked out of 1.0 | penalty 0

A force of 50 N is applied at an angle of 60 degrees to the horizontal. Find the horizontal component of the force.

- 25 N ✓

(8) **8**

NUMERICAL | marked out of 1.0 | penalty 0

A displacement vector has a magnitude of 15 m and makes an angle of 37 degrees with the positive x-axis. Determine its x-component.

- 12 m ✓

(9) **9**

NUMERICAL | marked out of 1.0 | penalty 0

Two vectors A = 4i + 3j and B = -2i + 5j are added. Find the magnitude of the resultant vector.

- 5.83 ✓

(10) **10**

NUMERICAL | marked out of 1.0 | penalty 0

Find the angle between the vectors A = 3i + 4j and B = 5i + 12j using the dot product formula.

- 18.43 degrees ✓

Total of marks: 10