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PHYSICS TEST – CHAPTER 2: VECTORS

Name:		Roll No.		Section:

Total Time: 2:30 Hour
Time Allowed: 150 Minutes

Total Marks: 150

PAPER OBJECTIVE
SECTION-A (MARKS 150)

NOTE: Section-A is compulsory. All parts of this section are to be answered on these pages and handed over to the center superintendent. Deleting / overwriting is not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark.

Questions	A	B	C	D	A B C D
1. Quantities completely described by a number and a proper unit are called:	vectors	unit vectors	scalars	components	○○●○
2. Quantities that need direction along with a number and a unit are called:	scalars	constants	vectors	variables	○○●○
3. Which of the following is a vector quantity?	mass	displacement	time	distance	○●○○
4. Which of the following is a scalar quantity?	distance	displacement	force	torque	●○○○
5. Graphically, the length of the line representing a vector shows its:	direction	magnitude	unit vector	component	○●○○
6. Graphically, the arrowhead of a vector represents its:	magnitude	scale	direction	unit	○○●○
7. A signboard gives the distance to a city along with its direction from the board. This combination is a:	displacement	scalar distance only	speed	time interval	●○○○
8. A tourist knows only the distance to a destination, not the direction. Distance alone is:	a vector and enough to reach	a unit vector	a displacement	a scalar and not enough to reach the destination	○○○●
9. Which of the following is a vector?	10 N towards east	10 kg	10 s	10 m of rope	●○○○
10. A vector is drawn 3 cm long on a scale of 1 cm = 2 N. Its magnitude is:	6 N	1.5 N	3 N	5 N	●○○○
11. Components of a vector which are mutually perpendicular are called:	parallel components	rectangular components	unit components	scalar components	○●○○
12. The component of a vector along the x-axis is called its:	vertical component	horizontal component	position component	scalar component	○●○○
13. In 2-D, the number of rectangular components of a vector is:	2	1	3	4	●○○○
14. In component form a vector A is written as:	A = Ax i + Ay j	A = Ax j + Ay i	A = Ax Ay	A = Ax – Ay	●○○○

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Questions	A	B	C	D	A B C D
15. The unit vectors i and j represent directions along:	+y-axis and +z-axis	+z-axis and +x-axis	+x-axis and +y-axis	–x-axis and –y-axis	○○●○
16. For a vector A making angle θ with the horizontal, Ax equals:	A sin θ	A tan θ	A cos θ	A / cos θ	○○●○
17. For a vector A making angle θ with the horizontal, Ay equals:	A cos θ	A tan θ	A / sin θ	A sin θ	○○○●
18. The magnitude of a vector from its rectangular components is:	Ax + Ay	$Ax^2 + Ay^2$	$\sqrt{(Ax^2 + Ay^2)}$	√(Ax Ay)	○○●○
19. The direction angle of a vector from its components is:	$\theta = \tan^{-1}(Ay/Ax)$	$\theta = \tan^{-1}(Ax/Ay)$	$\theta = \sin^{-1}(Ay\ Ax)$	$\theta = \cos^{-1}(Ay/Ax)$	●○○○
20. The position vector r = a i + b j has magnitude:	a + b	$a^2 + b^2$	ab	$\sqrt{(a^2 + b^2)}$	○○○●
21. A peddler pushes a trolley with 50 N at 30° to the road. The horizontal component is:	43.3 N	25 N	50 N	86.6 N	●○○○
22. A peddler pushes a trolley with 50 N at 30° to the road. The vertical component is:	43.3 N	50 N	86.6 N	25 N	○○○●
23. A force of 100 N acts at 60° with the horizontal. Its horizontal component is:	86.6 N	50 N	100 N	173 N	○●○○
24. A force of 100 N acts at 60° with the horizontal. Its vertical component is:	50 N	100 N	86.6 N	57.7 N	○○●○
25. A force of 10 N makes 30° with the horizontal. Its x-component is:	8.7 N	5 N	10 N	17.3 N	●○○○
26. A force of 40 N acts at 30° above the ground. Its vertical component is:	34.6 N	40 N	20 N	80 N	○○●○
27. A force of 20 N acts at 45° with the horizontal. Its horizontal component is about:	20 N	10 N	14.1 N	28.3 N	○○●○
28. A force of 30 N acts exactly along the +y-axis. Its x-component is:	30 N	15 N	–30 N	0 N	○○○●
29. Fatima pulls a bag with x-component 12 N and y-component 5 N. The total force is:	17 N	7 N	60 N	13 N	○○○●
30. A rope pulls with components 9 N horizontally and 12 N vertically. The force is:	21 N	15 N	3 N	108 N	○●○○
31. A man walks 6 m east and then 8 m north. The magnitude of his displacement is:	10 m	14 m	2 m	48 m	●○○○

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Questions	A	B	C	D	A B C D
32. Two forces of 3 N and 4 N act at right angles to each other. The resultant force is:	7 N	5 N	1 N	12 N	○●○○
33. Two forces of 6 N and 8 N act at right angles. The resultant force is:	14 N	10 N	2 N	48 N	○●○○
34. A vector has Ax = 5 and Ay = 5. Its direction angle with the x-axis is:	30°	60°	90°	45°	○○○●
35. A vector has Ax = 1 and Ay = √3. Its direction angle with the x-axis is:	30°	45°	60°	90°	○○●○
36. A vector has Ax = √3 and Ay = 1. Its direction angle with the x-axis is:	60°	30°	45°	0°	○●○○
37. A point has position vector r = 3i + 4j. The magnitude of r is:	7	5	25	12	○●○○
38. A force makes 30° with the horizontal and its horizontal component is 20 N. The force is:	17.3 N	23.1 N	40 N	10 N	○●○○
39. A vector is 3i + 4j. Its x-component and y-component are respectively:	4 and 3	5 and 3	3 and 4	7 and 1	○○●○
40. When the product of two vectors gives a scalar, it is called the:	vector (cross) product	position product	scalar (dot) product	component product	○○●○
41. The scalar product of A and B making angle θ is:	AB cos θ	AB sin θ	AB tan θ	A + B	●○○○
42. A cos θ is the component of vector A:	perpendicular to B	along the y-axis only	opposite to B	along the direction of B	○○○●
43. The scalar product obeys the commutative property, so A·B =	B·A	−B·A	0	AB sin θ	●○○○
44. The scalar product of two orthogonal vectors is:	zero	AB	−AB	1	●○○○
45. For mutually perpendicular unit vectors, i·j = j·k = k·i =	1	0	−1	k	○●○○
46. The dot product of a vector with the null vector is:	1	zero	infinity	the vector itself	○●○○
47. The scalar product of two parallel vectors is:	AB (maximum)	zero	−AB	A/B	●○○○
48. The scalar product of two antiparallel vectors is:	AB	zero	A/B	−AB	○○○●

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Questions	A	B	C	D	A B C D
49. The scalar product of a vector with itself, A·A, equals:	0	2A	A^2	A	○○●○
50. For unit vectors, i·i = j·j = k·k =	0	–1	1	i	○○●○
51. In rectangular components, A·B =	AxBx + AyBy + AzBz	AxBy + AyBz + AzBx	AxBx AyBy AzBz	AyBz – AzBy	●○○○
52. The angle between two vectors satisfies cos θ =	AB / A·B	A·B / AB	A×B / AB	A·B × AB	○●○○
53. Work is the scalar product of force and displacement, so W =	F·d	F × d	F/d	d/F	●○○○
54. Power is the scalar product of force and velocity, so P =	F × v	F/v	v/F	F·v	○○○●
55. Electric flux Φ = E·A is a:	vector quantity	scalar quantity	unit vector	position vector	○●○○
56. A force of 10 N acts on a body displaced 5 m in the direction of the force. Work done is:	15 J	2 J	50 J	0 J	○○●○
57. A force of 10 N acts on a body displaced 5 m at 60° to the force. Work done is:	50 J	43.3 J	25 J	12.5 J	○○●○
58. A person carries a bag horizontally; the lifting force is vertical. Work done by that force is:	zero	maximum	negative	equal to the product of the magnitudes	●○○○
59. A force of 10 N acts opposite to the 5 m displacement of a body. Work done is:	–50 J	50 J	0 J	–25 J	●○○○
60. F = (4i + 3j) N and d = (2i + 5j) m. The work done W = F·d is:	14 J	23 J	11 J	–7 J	○●○○
61. F = (5i + 2j) N and d = (3i – 4j) m. The work done is:	23 J	15 J	7 J	–7 J	○○●○
62. Example 2.2: v = (3i + 4j) m/s and F = (8i – 2j) N. The power delivered is:	32 W	16 W	24 W	8 W	○●○○
63. F = (2i + 3j) N and v = (4i + j) m/s. The power delivered is:	8 W	11 W	14 W	5 W	○●○○
64. F = (6i – 2j) N and v = (2i + 6j) m/s. The power delivered is:	24 W	–24 W	0 W	12 W	○○●○
65. A = 3i + 2j and B = 2i – 3j. The dot product A·B is:	12	0	–5	13	○●○○

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Questions	A	B	C	D	A B C D
66. A = 3i + 2j and B = 2i – 3j. The angle between them is:	90°	0°	180°	45°	● ○ ○ ○
67. A = 2i + 3j and B = 4i – j. The dot product A·B is:	11	8	5	–3	○ ○ ● ○
68. A = i + 2j + 3k and B = 4i – 2j + k. The dot product A·B is:	3	11	–3	9	● ○ ○ ○
69. A = 3i + 4j. The value of A·A is:	5	7	25	12	○ ○ ● ○
70. A = 3i and B = 3i + 3j. The angle between A and B is:	30°	45°	60°	90°	○ ● ○ ○
71. A = 4, B = 6 and A·B = 12. The angle between A and B is:	30°	45°	90°	60°	○ ○ ○ ●
72. Assignment 2.2: A = 5i + j and B = 2i + 4j. The dot product A·B is:	10	4	24	14	○ ○ ○ ●
73. For A = 5i + j and B = 2i + 4j, the projection of A on B (A·B/B) is:	14/√20	14/√26	14	√20/14	● ○ ○ ○
74. For A = 5i + j and B = 2i + 4j, the projection of B on A is:	14/√20	14	√26/14	14/√26	○ ○ ○ ●
75. The component of A = 4i + 3j along the x-axis (A·i) is:	3	4	5	7	○ ● ○ ○
76. Two vectors A and B satisfy |A + B| = |A – B|. The angle between them is:	90°	0°	180°	45°	● ○ ○ ○
77. Two non-zero vectors have A·B = 0. They are:	parallel	perpendicular	antiparallel	equal	○ ● ○ ○
78. Two vectors have A·B = AB. They are:	perpendicular	antiparallel	equal and opposite	parallel	○ ○ ○ ●
79. Two vectors have A·B = –AB. They are:	parallel	perpendicular	antiparallel	equal	○ ○ ● ○
80. The scalar product of two vectors is maximum when the angle between them is:	45°	90°	0°	180°	○ ○ ● ○
81. To find the angle between two vectors easily, one uses the:	cross product	head to tail rule	dot product	right hand rule	○ ○ ● ○
82. When the product of two vectors gives a vector, it is called the:	scalar product	vector (cross) product	dot product	component	○ ● ○ ○

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Questions	A	B	C	D	A B C D
83. The vector product of A and B is defined as A × B =	AB cos θ	AB sin θ n̂	AB tan θ	A + B	○●○○
84. The direction of the cross product is:	along A	along B	along A + B	perpendicular to the plane containing A and B	○○○●
85. The direction of a cross product is found by the:	right hand rule	left hand rule	head to tail rule	Pythagoras rule	●○○○
86. The vector product is not commutative but is:	commutative	anti-commutative	scalar	always positive	○●○○
87. A × B is equal to:	B × A	0	– B × A	AB	○○●○
88. The vector product of two parallel or antiparallel vectors is:	AB	–AB	A/B	zero	○○○●
89. The vector product of a vector with itself, A × A, equals:	A^2	A	zero	1	○○●○
90. For unit vectors, i × j =	–k	i	0	k	○○○●
91. For unit vectors, j × k =	–i	i	k	0	○●○○
92. For unit vectors, k × i =	j	–j	i	0	●○○○
93. The vector product of two perpendicular vectors is:	zero	negative	A/B	maximum, equal to AB	○○○●
94. The magnitude of A × B gives the area of:	a sphere	a cube	a line	the parallelogram formed by A and B	○○○●
95. The torque is given by:	τ = r × F	τ = r · F	τ = F/r	τ = r + F	●○○○
96. The angular momentum is given by:	L = r × p	L = r · p	L = p/r	L = r + p	●○○○
97. The right hand rule says to rotate the fingers from the first vector to the second through the:	smaller of the two possible angles	larger of the two angles	angle of 180° only	angle of 90° only	●○○○
98. In the right hand rule, the direction of the product is along the:	curled fingers	palm	erect thumb	first vector	○○●○
99. Using the right hand rule, A is along +x and B along +y. A × B points along:	+z	–z	+x	+y	●○○○

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Questions	A	B	C	D	A B C D
100. With A along +x and B along +y, the vector B × A points along:	–z	+z	+y	–x	● ○ ○ ○
101. A student evaluates j × i. The result is:	–k	k	0	i	● ○ ○ ○
102. A student evaluates i × k. The result is:	j	–j	k	0	○ ● ○ ○
103. A student evaluates k × j. The result is:	–i	i	0	k	● ○ ○ ○
104. A student evaluates j × j. The result is:	0	1	k	–k	● ○ ○ ○
105. Two vectors of magnitudes 3 and 4 make 30° with each other. |A × B| is:	12	10.4	7	6	○ ○ ○ ●
106. Two vectors of magnitudes 3 and 4 are perpendicular. |A × B| is:	6	0	7	12	○ ○ ○ ●
107. Two vectors of magnitudes 3 and 4 are parallel. |A × B| is:	12	7	1	0	○ ○ ○ ●
108. Assignment 2.3: magnitudes 3.2 and 5.2 units at 60°. The magnitude of the cross product is:	16.6 units	14.4 units	8.3 units	9.0 units	○ ● ○ ○
109. Vectors of magnitudes 3.2 and 5.2 units make 60°. Their dot product is:	14.4	16.6	0	8.32	○ ○ ○ ●
110. A = 2i + 3j and B = 4i + j. Their cross product A × B is:	10k	–10k	14k	5k	○ ● ○ ○
111. A = 2i and B = 3j. Their cross product A × B is:	–6k	6	6k	5k	○ ○ ● ○
112. Example 2.3: A = i + 6j + 2k and B = 7i + j + 5k. A × B is:	28i – 9j – 41k	28i + 9j – 41k	–28i + 9j + 41k	28i + 9j + 41k	○ ● ○ ○
113. Two adjacent sides of a parallelogram are 5 m and 4 m with 30° between them. Its area is:	20 m²	10 m²	17.3 m²	9 m²	○ ● ○ ○
114. Two adjacent sides of a rectangle are 6 m and 4 m. The area using |A × B| is:	12 m²	10 m²	24 m²	0 m²	○ ○ ● ○
115. A force of 20 N acts at 90° to a position vector of 0.5 m. The torque magnitude is:	20 N m	10 N m	40 N m	0 N m	○ ● ○ ○
116. A force of 20 N acts at 30° to a position vector of 0.5 m. The torque magnitude is:	10 N m	8.7 N m	0 N m	5 N m	○ ○ ○ ●

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Questions	A	B	C	D	A B C D
117. A force acts along the line of the position vector (θ = 0°). The torque is:	maximum	negative	equal to rF	zero	○○○●
118. If the cross product of two vectors vanishes, they must be:	perpendicular	at 45°	at 60°	parallel or antiparallel	○○○●
119. The dot product and the cross product of two vectors are both zero. At least one of them is a:	unit vector	position vector	parallel vector	null vector	○○○●
120. The magnitude of the cross product of two vectors is √3 times their dot product. The angle between them is:	30°	45°	90°	60°	○○○●
121. The magnitudes of dot and cross products of two vectors are equal. The angle between them is:	30°	60°	45°	90°	○○●○
122. The dot product of two vectors is 6√3 and the magnitude of their cross product is 6. The angle between them is:	60°	45°	90°	30°	○○○●
123. Vectors 5.5 N at 10° and 4.3 at 80° to the x-axis have a dot product of about:	22.2	8.1	23.7	12.3	○●○○
124. Vectors 5.5 N at 10° and 4.3 at 80° to the x-axis have a cross product magnitude of about:	8.1	23.7	22.2	12.3	○○●○
125. A student evaluates i·(j × k). The result is:	0	–1	1	k	○○●○
126. A student evaluates j·(j × k). The result is:	1	0	–1	j	○●○○
127. The unit vectors i, j and k have:	units of metre	no units	units of newton	units of kilogram	○●○○
128. A vector with unit magnitude and arbitrary direction is called a:	position vector	null vector	scalar	unit vector	○○○●
129. A vector which specifies the location of a point with respect to the origin is called a:	position vector	unit vector	null vector	resultant	●○○○
130. A vector is A = 6i + 8j. Its magnitude is:	14	2	10	48	○○●○
131. A boy pulls a sled with 10 N at 60° to the ground. The x-component is:	5 N	8.7 N	10 N	17.3 N	●○○○
132. A vector makes 30° with the x-axis. The ratio Ay/Ax equals:	√3	1	½	1/√3	○○○●
133. A force of 30 N acts along the +x-axis (θ = 0°). Its x-component is:	0 N	15 N	60 N	30 N	○○○●

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Questions	A	B	C	D	A B C D
134. The vector product is also known as the:	dot product	scalar product	component product	cross product	○○○●
135. The scalar product is also known as the:	cross product	dot product	vector product	unit product	○●○○
136. The product of the magnitude of one vector and the component of the other along it defines the:	vector product	unit vector	position vector	scalar product	○○○●
137. A × B and B × A have the same:	direction	sign	magnitude	unit vector	○○●○
138. F = (3i + 4j) N and d = (4i − 3j) m. The work done is:	24 J	0 J	25 J	7 J	○●○○
139. F = (2i + j) N and v = (i + 3j) m/s. The power delivered is:	2 W	5 W	3 W	7 W	○●○○
140. A = i + j and B = i − j. The dot product A·B is:	0	2	1	−2	●○○○
141. A = 3i + 4j and B = 4i − 3j. The cross product A × B is:	−25k	25k	0	7k	●○○○
142. A = i + j and B = 2i + 2j. The cross product A × B is:	2k	4k	−2k	0	○○○●
143. A force of 5 N acts perpendicular to a position vector of 4 m. The torque magnitude is:	20 N m	9 N m	1 N m	0 N m	●○○○
144. A body has r = 2 m and p = 6 (SI units) at 30° to each other. The magnitude of L = r × p is:	6	12	10.4	3	●○○○
145. If A × B = 10k, then B × A is:	10k	0	−10k	20k	○○●○
146. Two unit vectors are perpendicular. Their dot product and cross product magnitude are:	1 and 0	0 and 0	1 and 1	0 and 1	○○○●
147. Two unit vectors are parallel. Their dot product and cross product magnitude are:	0 and 1	0 and 0	1 and 0	1 and 1	○○●○
148. A parallelogram has adjacent sides A = 2i and B = 3j. Its area is:	5	1	6	0	○○●○
149. The magnitude of a cross product is maximum when the angle between the vectors is:	0°	45°	90°	180°	○○●○
150. The magnitude of a cross product is zero when the angle between the vectors is:	90° only	45°	60°	0° or 180°	○○○●

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