eExam Question Bank

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	Question Type	Question	A	B	C	D	An
	FBQ	If $$f = x^2yz$$ and $$g = xy - 3z^2$$, calculate $$\nabla \cdot (\nabla f x \nabla g)$$	0	zero			
	FBQ	The vector product of a and b is denoted by	axb	a xb			
	FBQ	Determine the directional derivative of $$f = xy^2 + yz^3$$ at the point (2, -1, 1) in the direction of vector i+2j+2k (answer to 3 decimal places)	-3.667				
	FBQ	A convectional vector that could reversed by changing from a right-hand to left – hand convection is called an _?	axial				
	FBQ	A quantity specified by magnitude alone is called quantity	Scalar				
	FBQ	A vector could be defined as a quantity which has both magnitude and	direction				

	FBQ	If $$r_1 = 3i - 2j + k$$, $$r_2 = 2i - 4j - 3k$$ and $$r_3 = -i + 2j + 2k$$ what is the magnitude of $$r_3$$	3				
	FBQ	The two energy referred to in conservation of energy are and Energy (separate your answers with a coma and a single space)	Kinetic, potential	Potential, kinetic			
	FBQ	The work done in moving a system of particles from a state with kinetic energy (50f+d) to a state of kinetic energy of (72f+4d) is	22f+3d				
	FBQ	How many degrees of freedom has 8 particles moving freely in space	24				
	FBQ	The limitations on the motion of a particle or system of particles that can be expressed as an equation is called	Holonomic				
	FBQ	For $$r_{1}=2i-j+k$$, $$r_{2}=i+3j-2k$$, $$r_{3}=-2i+j-3k$$, $$r_{4}=3i+2j+5k$$, find b such that $$r_{4}=ar_{1}+br_{2}+cr_{3}$$	1				
	FBQ	mathematical model in which the distance between any two specified particles of a system remains the same regardless of applied forces is called?	Rigid body				
	FBQ	If a and b are non-collinear vectors and A = (x + 4y) a + (2x+y+1)b and B = (y-2x+2)a+ (2x-3y-1)b, find y such that 3A = 2B	-1				

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>FBQ</td><td>Find the resultant of the following displacements: A, 20 Km 30° south of east; B, 50 Km due west; C, 40 Km northeast; D, 30 Km 60° south of west ______ Kg (answer to a decimal place)</td><td>20.9</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>MCQ</td><td>The scalar triple product vanishes if the vectors are __</td><td>axial vector</td><td>planar vector</td><td>coplanar vector</td><td>flexural vector</td><td>C</td></tr>
<tr><td></td><td>MCQ</td><td>The scalar product b.c implies that</td><td>the length of b divided by the projection of c on b, or vice versa.</td><td>the length of b multiplied by the projection of c on b, or vice versa.</td><td>the product of b and c multiplied by the projection of c on b, or vice versa.</td><td>all of the above</td><td>B</td></tr>
<tr><td></td><td>MCQ</td><td>The Scalar product is defined as</td><td>\[a\dot b = ab Sin\theta\]</td><td>\[a\dot b = ab Cos\theta\]</td><td>\[a x b = ab Sin\theta\]</td><td>None of the above</td><td>B</td></tr>
<tr><td></td><td>MCQ</td><td>If\[\theta\] is the angle between the vectors a and b, then by elementary trigonometry the length of their sum is given by</td><td>\[(a + b)^2 = a^2 + b^2 + 2abCos\theta\]</td><td>\[(a + b)^2 = a^2 - b^2 + 2abSin\theta\]</td><td>\[(a - b)^2 = a^2 + b^2 + 2abCos\theta\]</td><td>\[(a + b)^2 = a^2 + b^2 + 2abSin\theta\]</td><td>A</td></tr>
<tr><td></td><td>MCQ</td><td>The addition of two vectors a and b defined geometrically by drawing one vector from the head of a to b is known as the………….. .</td><td>triangular law for addition of forces.</td><td>rectangular law for addition of forces</td><td>law of addition of forces</td><td>parallelogram law for addition of forces</td><td>D</td></tr>
<tr><td></td><td>MCQ</td><td>What is the relationship between vectors a and b if \[a\dot b = 0 \]?</td><td>Parallel</td><td>Symmetrical</td><td>Perpendicular</td><td>Asymmetrical</td><td>C</td></tr>
<tr><td></td><td>MCQ</td><td>The vector product of any two non-parallel vectors a and b drawn from 0 define a unique axis through the origin 0 perpendicular to the plane containing a and b is given by</td><td>$$\left|a \times b \right| = ab sin \theta$$</td><td>$$\left|a \times b \right| = ab cos \theta$$</td><td>$$\left|b \times a \right| = ab sin \theta$$</td><td>$$\left|b \times a \right| = ab cos \theta$$</td><td>A</td></tr>
<tr><td></td><td>MCQ</td><td>Gauss' theorem states that if V is a volume in space bounded by the closed surface S,then for any vector field B</td><td>$$\iint dV\bigtriangledown\cdot B = \iint_{s} dS \cdot B$$</td><td>$$\iiint_{v} dV\bigtriangledown\cdot B = \iint_{s} dV \cdot B$$</td><td>$$\iiint_{v} dV\bigtriangledown\cdot B = \iint_{s} dS \cdot B$$</td><td>$$\iiint_{v} dV\bigtriangledown\cdot S = \iint_{s} dS \cdot B$$</td><td>B</td></tr>
<tr><td></td><td>MCQ</td><td>Stokes' theorem states that if A is any vector field, then</td><td>$$\int\int dS\cdot(\bigtriangledown \times A) = \oint_{c}dr\cdot A$$</td><td>$$\int\int dS\cdot(\bigtriangledown \times A) = \oint dr\cdot A$$</td><td>$$\int dS\cdot(\bigtriangledown \times A) = \oint_{0}dr\cdot A$$</td><td>none of the above</td><td>A</td></tr>
<tr><td></td><td>MCQ</td><td>The vector product of a and b is denoted by</td><td>$$a \cdot b$$</td><td>a, b</td><td>\[a ^b\]</td><td>a x b</td><td>D</td></tr>
<tr><td></td><td>MCQ</td><td>Let T be a symmetric tensor such that $$T.a = \lambda a$$ then $$\lambda$$ is called……………… of T</td><td>unit vector</td><td>eigenvalue</td><td>eigenvector</td><td>all of the above</td><td>B</td></tr>
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<tr><td></td><td>MCQ</td><td>When was a system of particles in equilibrium ?</td><td>When the total virtual work of the actual force is at equilibrium</td><td>When the total virtual work of the actual force is zero</td><td>When the total virtual work of the actual force is constant</td><td>When the total force of the actual work is zero</td><td>B</td></tr>
</table>

	MCQ	Let $$ a=(3i-2j+k)$$, $$b=2i-4j-3k$$ and $$c=-i+2j+2k$$, find the magnitude of a+b+c	$$4\sqrt{2}$$	$$5\sqrt{2}$$	$$8\sqrt{3}$$	$$4\sqrt{3}$$	A
	MCQ	For a body of mass m with a acceleration D' Alembert's principle can be expressed as	$$(m_{i}a_{i}).\delta r_{i}=0$$	$$(\sum_{N}^{i=1}F_{i}-m_{i}a_{i}).\delta r_{i}=\frac{m}{a} $$	$$(\sum_{N}^{i=1}F_{i}-m_{i}a_{i}).\delta r_{i}=0$$	$$(\sum_{N}^{i=1}m_{i}-m_{i}a_{i}).\delta r_{i}=0$$	C
	MCQ	The force acting on a particle at time t is F(t)=6ti+j, If the particle starts from the point (3,-1,2) with the velocity v(0)=4k, find parametric equations of its path in y directio	$$y=\frac{3t}{2m}-6$$	$$y=\frac{t}{2m}-2$$	$$y=\frac{t^{3}}{2m}-3$$	$$y=\frac{t^{2}}{2m}-1$$	D
	MCQ	Determine the unit tangent vector for the curve x=3t; y=2t2; z=t2+t at the point (6,8,6).	$$\frac{2}{\sqrt{3}}(2i+8j+6k)$$	$$\frac{5}{\sqrt{81}}(i+2j+5k)$$	$$\frac{1}{\sqrt{98}}(3i+8j+5k)$$	$$\frac{3}{\sqrt{5}}(3i+j+5k)$$	C
	MCQ	If $$F=isin2t+je^{3t}+k(t^{t}-4t)$$, find dF/dt	$$2cos2i+3e^{3}j-k $$	$$cos2i+3e^{3}j-k $$	$$2cos2i+3e^{3}j-4k $$	$$2cosi+3e^{3}j-2k $$	A
	MCQ	$$A=2i+3j+4k$$ and $$B=i-2j+3k$$ find the angle between vectors A and B	$$32^{o}54^{1}$$	$$48^{o}32^{1}$$	$$72^{o}30^{1}$$	$$66^{o}36^{1}$$	D
	MCQ	A man travelling southward at 15 m/hr observes that the wind appears to be coming from the west. On increasing his speed to 25 m/hr it appears to be coming from the southwest. Find the direction and speed of the wind	The wind is coming from a direction 56°18' east of west at 15 m/hr	The wind is coming from a direction 56°18' north of west at 18 m/hr	The wind is coming from a direction 56°18' south of west at 15 m/hr	The wind is coming from a direction 56°18' north of east at 18 m/hr	B

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