Katwa College
Department of Physics
Semester – I
Major: Phys1011
Sub: Physics
Internal Assessment -2024

Time: 1hr. **F.M.- 15**

Answer any three questions:

1. **Prove that dof product of two vectors behaves as a scalar.**
2. **Find a unit vector in the plane of vectors**

$\vec{A} = \hat{\imath} + 2\hat{\jmath} - \hat{k}$, $\vec{B} = \hat{\imath} + \hat{\jmath} - 2\hat{k}$ **that is perpendicular to**
$\vec{C} = 2\hat{\imath} - \hat{\jmath} + \hat{k}$ **.**

3. **For any three vectors** $\vec{a}, \vec{b}, \vec{c}$, **prove that**

$$\left[\vec{a}.(\vec{b}\ x\ \vec{c})\right]^2 = \begin{vmatrix} \vec{a}.\ \vec{a} & \vec{a}.\ \vec{b} & \vec{a}.\ \vec{c} \\ \vec{a}.\ \vec{b} & \vec{b}.\ \vec{b} & \vec{b}.\ \vec{c} \\ \vec{a}.\ \vec{c} & \vec{b}.\ \vec{c} & \vec{c}.\ \vec{c} \end{vmatrix}$$

4. **Plot the graph of y =** $|x - 2| + |x - 3|$

5. **Solve the differential equation** $x\frac{dy}{dx} + y = x^3 + x$

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Time: 1.30 hr. **F.M. - 10**

Answer any five question

1. Plot the function :- y=x-1
2. State Newton's first law of motion
3. Define velocity and acceleration.
4. Find the dimension of pressure.
5. What is work done?
6. Define conservative force.
7. Find the condition for orthogonality of two vectors.
8. A particle is moving along x-axis whose position function is given by $x=2+4t^2$. Find the instantaneous velocity time t=3 second (x is in metrc)

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Minor: Phys1021
Sub: Physics
Internal Assessment

Time: 45 min. **F.M. – 10**

Answer any 3 questions:-

1. **Plot the graph of** $y = x^2 - 4x - 5$
2. **Show that** $\lim_{x \to 0} \frac{|x|}{x}$ **does not exist.**
3. **Solve the differential equation:-** $(y+2)y' = \sin x$, $y(0) = 0$
4. **A force** $\vec{F} = \left(\hat{I} + \hat{J} + \hat{K}\right)$ **n acts on a particle which moves from (2, 1, -3) m to (1, -1, 2) m. What is the work done by the force during displacement?**
5. **Find a unit vector in the yz plane such that if is perpendicular to** $\vec{A} = \hat{\imath} + \hat{\jmath} + \hat{k}$