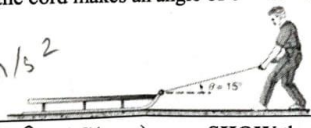


M. Obaid
CT-025

DATED: 28-11-2023

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
BACHELORS COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
APPLIED PHYSICS (PH-122)
MID-TERM EXAMINATION

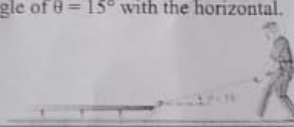
PAPER-A

Q.1	ILLUSTRATE the formation of the pn junction and depletion region. DESCRIBE depletion region and explain how the electric field across the pn junction created?	04 marks	CLO-1
Q.2	An elevator cab of mass 920 kg moves from street level to the top of the World Trade Center in New York, a height of 412 meter above ground. CALCULATE the change in the gravitational potential energy of the cab-Earth system?	04 marks	CLO-2
Q.3	A sled of mass $m = 7.5$ kg is pulled along a frictionless horizontal surface by a cord. A constant force of $F = 20$ N is applied to the cord. DETERMINE the motion if (a) the cord is horizontal and (b) the cord makes an angle of $\theta = 15^\circ$ with the horizontal. $a_1 = 2.67$ $a_2 = 2.58 \text{ m/s}^2$ 	04 marks	CLO-2
Q.4	If $\vec{V} = yz^2 \hat{i} - 3xz^2 \hat{j} + 2xyz \hat{k}$ and $\phi(x,y,z) = xyz$. SHOW that $(\vec{V} \times \nabla) \cdot \phi = \vec{V} \cdot (\nabla \phi)$	04 marks	CLO-2
Q.5	A 2.0-kg block of wood is on a level surface where $\mu_s = 0.80$ and $\mu_k = 0.60$. A 13.7-N force is being applied to the block parallel to the surface. If the block was originally in motion , and the 13.7-N applied force is in the direction of motion. ANALYZE if it will remain at rest, or begin to slide. $a = 0.97 \text{ m/s}^2$	04 marks	CLO-2

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PAPER-B

Q.1	DETERMINE the class of material based on relative comparisons. EXPLAIN what the barrier potential is and how it is created?	04 marks	CLO-1
Q.2	At the end of the track in a certain train terminal, trains are prevented from crashing into the platform by a bumper mounted on a stiff spring of force constant (k) 1.25×10^8 N/m. One day a train hits the bumper and compresses the spring by a distance of 5.6 cm when it is brought to rest. CALCULATE the potential energy stored in the spring at that compression?	04 marks	CLO-2
Q.3	A sled of mass $m = 7.5$ kg is pulled along a frictionless horizontal surface by a cord. A constant force of $F = 20$ N is applied to the cord. DETERMINE the motion if (a) the cord is horizontal and (b) the cord makes an angle of $\theta = 15^\circ$ with the horizontal. 	04 marks	CLO-2
Q.4	A particle travels along the inside of an evacuated straight tube undergoing a non-constant force $F = e^{-t} + 2\cos 3t + 2\sin 3t$. ANALYZE total work done of the particle from $t = 0 \text{ sec} \rightarrow 1 \text{ sec}$.	04 marks	CLO-2
Q.5	A 2.0-kg block of wood is on a level surface where $\mu_s = 0.80$ and $\mu_k = 0.60$. A 13.7-N force is being applied to the block parallel to the surface. If the block was originally at rest . ANALYZE if it will remain at rest, or begin to slide.	04 marks	CLO-2

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