M.Obaid
CT-025

DATED: 28-11-2023

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

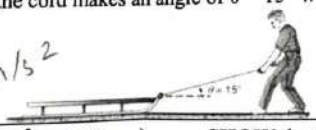
PAPER-A

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 $\theta = 15°$ with the horizontal.	04 marks	CLO-2
Q.4	If $\vec{V} = yz^2\,\hat{\imath} - 3xz^2\,\hat{\jmath} + 2xyz\hat{k}$ and $\emptyset(x,y,z) = xyz$. **SHOW** that $(\vec{V} \times \nabla).\emptyset = \vec{V} \times (\nabla.\emptyset)$	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 ap plied force is in the direction of motion. **ANALYZE** if it will remain at rest, or begin to slide.	04 marks	CLO-2

3.7×10^6 J

$a_1 = 2.67$

$a_2 = 2.58\ m/s^2$



$a = 0.97\ m/s^2$

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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 $\theta = 15°$ 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 $F = e^{-t} + 2Cos3t + 2Sin3t$. **ANALYZE** total work done of the particle from $t = 0sec \rightarrow 1sec.$	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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