SEAT NO. CT - 23025

NED UNIVERSITY OF ENGINEERING & TECHNOLOGY

FIRST YEAR (Bachelor of Science in Computer Science& Information Technology/ Bachelor of Science in Computer Science Specialization in "Artificial Intelligence")

FALL SEMESTER EXAMINATIONS 2023

Batch 2023

Time: 3 Hours

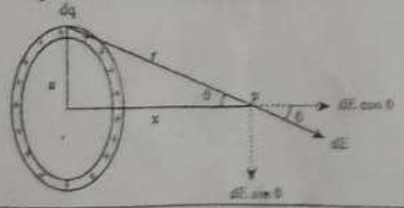
Dated:24-01-2024

Max.Marks:60

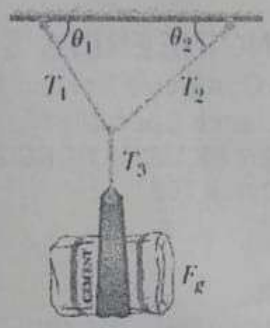
Applied Physics- PH-122

NOTE:

- **Attempt all Questions.**
- **Questions should be attempted maintaining the sequential order.**
- **All questions carry equal marks.**

Q.1	**EXPLAIN** how Huygen's principle provides the understanding of wave propagation. **DISCUSS** Huygen's Fresnel correction.	5 marks	CLO-1
Q.2	**ILLUSTRATE** the response of harmonic oscillator driven, by an $F_{external}$, at its natural frequency of vibrations. Can small or large damping modify a resonating system, demonstrate graphically?	5 marks	CLO-1
Q.3	**CLASSIFY** Bi-polar Junction Transistors. **DISCUSS** VI characteristics of PN junction diode.	5 marks	CLO-1
Q.4	With the help of labeled diagram **DEMONSTRATE** how population inversion is achieved, **DISCUSS** modes of LASER operation?	5 marks	CLO-1
Q.5	An eardrum having mass "m" performs simple harmonic oscillation with restoring constant 'k'. **VERIFY** that the total mechanical energy E_T of the system remains conserved.	5 marks	CLO-2
Q.6	**ESTABLISH** expression for electric field "E" due to the ring of charges at a point "*P*" over distance "*x*" from central axis perpendicular to the plane of the ring having radius "*a*" carrying a uniformly distributed positive total charge "*Q*". 	5 marks	CLO-2
Q.7	A bag of cement weighing 325 N hangs from three strings. Two of the strings make an angle $\theta_1 = 60.0°$ and $\theta_2 = 40.0°$ with the horizontal. If the system is in equilibrium, **EVALUATE** the tensions T_1, T_2, and T_3 in the string.	5 marks	CLO-2

P.T.O

			
Q.8	A viewing screen is separated from a double-slit source by 1.2 m. The distance between the two slits is 0.030 mm and the second-order bright fringe is 4.5 cm from the central fringe. **CALCULATE** the distance between adjacent bright fringes.	**5 marks**	**CLO-2**
Q.9	**FIND OUT** (i) wavelength of photon scattered at $\theta = 35°$ from the incident radiation, if photons of wavelength 2.17 pico-meter are incident on free electrons, (ii) Maximum Compton wave shift corresponding to the interaction.	**5 marks**	**CLO-3**
Q.10	**CALCULATE** the binding energy per nucleon for $^{20}Ne_{10}$,$^{56}Fe_{26}$ and $^{238}U_{92}$. Given that mass of neutron is 1.008665 amu, mass of proton is 1.007825 amu, mass of $^{20}Ne_{10}$ is 19.9924 amu, mass of $^{56}Fe_{26}$ is 55.93492 amu, $^{238}U_{92}$ is 238.050783 amu. Take 1u=931.5 MeV	**5 marks**	**CLO-3**
Q.11	**FIND OUT** half-lie and decay rate of thorium sample having "N' radioactive nuclei. If 1 gram of thorium emits 4500 α-particles per second **FIND** half-life at mass 232.12 gram.	**5 marks**	**CLO-3**
Q.12	**CALCULATE** the De Broglie wavelength of, a) dust particle of mass 1.0×10^{-9} kg drifting with a speed of 2.0 cm/s, b) an electron whose Kinetic energy is 120 eV.	**5 marks**	**CLO-3**

$\varepsilon_o = 8.85 \times 10^{-12}$ Fm^{-1}	$m_e = 9.1 \times 10^{-31}$ kg	$e = 1.602 \times 10^{-19}$ C	$h = 6.626 \times 10^{-34}$ J.s	1 a.m.u $=1.66\times10^{-24}$g