Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam – 2080 Mangsir/Poush

Program: Health All **Full Marks: 60**

Year/Part: 1st Year (2016) **Pass Marks: 24**

Subject: Physics **Time: 3 hrs.**

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group 'A' [8×2=16]

Attempt any EIGHT questions.

1. Find the dimensional formula for universal gravitational constant.
2. At what angle horizontal range and vertical height of projectile are equal?
3. 'Cargo is placed at the bottom of the ship' why?
4. 'Water in the earthen pot is cold' why?
5. What are the conclusion of Faraday's ice pail experiment?
6. 'Magnetic lines of force never intersect each other' why?
7. Define capacitance of capacitor. Write its SI unit.
8. Which one is more dangerous? AC or DC?
9. X-ray production and photoelectric effect are reverse phenomena. Explain.
10. What are the causes of water pollution? Explain.

Group 'B' [6×4=24]

Attempt any SIX questions.

11. State and explain conservation of mechanical energy along with necessary graph.
12. Define 'g'. How does the value of 'g' vary with height from surface of earth.
13. Define radioactivity. Derive the expression $N=No\ e^{-\lambda t}$ where symbols have their usual meaning.
14. Define stress and strain. Derive the relation for energy stored in a stretched wire.
15. Define coefficient of superficial and cubical expansion. Derive the relation $\beta=2\alpha$ where symbols have their usual meaning.

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16. Define critical angle. Derive the relation $\mu = \frac{1}{Sin\ C}$ where symbols have their usual meaning.
17. Find the magnetic field intensity at any point in the equatorial line of bar magnet.
18. Define root mean square (r.m.s.) value of A.C. Derive expression for it in-terms of peak value.

Group 'C' [5×4=20]

Attempt any FIVE questions.

19. A projectile of mass 300 gm is fired from the ground with velocity 200 m/s by making angle 30° to the vertical. Find its time of flight, maximum height attend and horizontal range.
20. Calculate the minimum deviation produced by prism of refractive index 1.66. the angle of prism is 60°.
21. An electron has velocity of 4×10^5 m/s and moves in a circular orbit in a magnetic flux density of 0.4 Tesla. What will be the radius of orbit? [$e=1.6\times10^{-19}$ c, $m_e = 9.1\times10^{-31}$ kg]
22. Calculate the binding energy per nuclean for helium nucleus given that:
    Mass of Helium Nucleus = 4.001509 amu.
    Mass of Proton = 1.007277 amu.
    Mass of Neutron = 1.00866 amu.
23. At what temperature the velocity of sound is $\frac{2}{3}$ of velocity of sound at 127° C.
24. A galvanometer gives full scale deflection when 5 mA current flows. If the resistance of galvanometer is 2Ω, then:
    a. how will you convert it into ammeter which measures current up to 2A?
    b. a voltmeter of range (0–120) V.
25. What is the result of mixing 20 gm of water at 90° C with 10 gm of ice at –10° C. [Specific heat capacity of ice = 0.5 cal/gm°C, Latent heat of fusion of ice = 80 cal/gm and Specific heat of water = 1 cal/gm°C]

Good Luck !