PERAMIHO GIRLS' SECONDARY SCHOOL

FORM FIVE TERMINAL EXAMINATIONS NOVEMBER, 2022

PHYSICS

TIME: 3:00 HOURS
INSTRUCTIONS

- Answer all questions in this paper.

1. (a) Differentiate between
   (i) Dimensions and dimensional analysis
   (ii) Error and mistake
   (b) (i) Give at least three uses of dimensional equations
   (ii) A wave is set up in a stretched string depends upon tension of F in the string, its length, L and its mass M making use of knowledge of dimensions, prove that: $V = \sqrt{\frac{Tension}{Mass\ per\ unit\ length}}$
2. (a) (i) Name the principle under which rocket propulsion is based
   (ii) Prove that the thrust exerted by the exhaust gases as it propels upward is given by: $F = -V_{rel}\frac{dm}{dt}$ where all letters carry their usual meaning.
   (b) A rocket moving in free space has a speed of $3.0\times10^{3}\,m/s$ relative to the earth. Its engines are turned on, and fuel is ejected in a direction opposite the rocket's motion at a speed of $5.0\times10^{3}\,m/s$ relative to the rocket.
   (i) What is the speed of the rocket relative to the earth once the rocket's mans is reduced to one half its mass before ignition.
   (ii) What is the thrust on the rocket if it burns fuel at 0.77kg s^{-1}
3. (a) Define the following terms as used in projectile motio
   (i) Trajectory
   (ii) Range
   (iii) Time of flight
   (b) (i) Show that for a body undergoing projectile motio- its time of flight is given by: $T = 2\frac{U\sin\theta}{g}$
   (ii) A ball is thrown with a speed of 17m/s at a projection angle of 58° above the horizontal. Assuming the point of return of the ball is at the same horizontal level as the point of projection determine.
   (a) Time of flight
   (b) The range
   (c) Maximum height
4. (a) (i) Explain why a cyclist is advised to bend when negotiating a corner.
   (ii) A body of mass 8kg is moving in a horizontal circle of radius 3m with a constant speed of 10m/s. Determine the angular velocity and the centripetal force
   (b) Explain three applications of circular motion in daily life.
5. (a) Differentiate between displacement and amplitude
   (b) The equation of S.H.M is given as $x = 6\sin 10\pi t + 8\cos 10\pi$ where x is in cm and + is second. Find
   (i) Period
   (ii) Amplitude
   (iii) Initial phase of motion