PHYSICS EQUATIONS – 2nd SEMESTER

UNIVERSAL GRAVITATION	Force of Gravity = $\frac{\text{Gravity constant} \cdot \text{mass}_1 \cdot \text{mass}_2}{\text{distance}^2}$ $G = 6.67 \times 10^{-11}$ N-m²/kg² $r_{earth} = 6.38 \times 10^6$ m $m_{earth} = 5.98 \times 10^{24}$ kg	$F_g = \frac{Gm_1m_2}{d^2}$
ACCELERATION OF GRAVITY	Acceleration of Gravity = $\frac{\text{Gravity constant} \cdot \text{mass}}{\text{radius}^2}$	$a_g = \frac{G\,m}{r^2}$
TANGENTIAL VELOCITY	Tangential Velocity = Square root of $\frac{\text{Gravity constant} \cdot \text{mass}}{\text{radius}}$ mass – orbit center. radius - orbit	$v_t = \sqrt{\frac{G \cdot m}{r}}$
COULOMB'S LAW	Electrical Force = $\frac{\text{constant} \cdot \text{charge}_1 \cdot \text{charge}_2}{\text{distance}^2}$ $k = 9.0 \times 10^9$ N-m²/C²	$F_e = \frac{kq_1q_2}{d^2}$
OHM'S LAW	Electric Current = Voltage ÷ Resistance	$I = V/R$
ELECTRIC POWER	Electric Power = Current · Voltage	$P = IV$
ELECTRICAL ENERGY	Electric Energy = Power · time	$E = Pt$
ELECTRICAL COST	Cost = Energy · rate per kilowatt-hour	$\$ = E \cdot \text{rate}$
SERIES CIRCUITS	$\text{Resistance}_{total} = \text{Resistance}_1 + \text{Resistance}_2 \ldots.$ $\text{Voltage}_{total} = \text{Volts}_1 + \text{Volts}_2 + \text{Volts}_3 \ldots.$	$R_T = R_1 + R_2 + R_3 \ldots.$ $V_T = V_1 + V_2 + V_3 \ldots.$ (I constant)
PARALLEL CIRCUITS	$1/\text{Resistance}_{total} = 1/\text{Resistance}_1 + 1/\text{Resistance}_2 \ldots.$ $\text{Current total} = \text{Current}_1 + \text{Current}_2 + \text{Current}_3 \ldots.$	$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$ $I_T = I_1 + I_2 + I_3$ (V constant)
MAGNETIC FORCE	Magnetic Force = charge · velocity · magnetic field Magnetic Force = current · length · magnetic field	$F_B = q \cdot v \cdot B$ $F_B = I \cdot L \cdot B$
FREQUENCY & PERIOD	frequency = 1 ÷ Period Period = 1 ÷ frequency	$f = 1/T$ $T = 1/f$
VELOCITY OF A WAVE	Velocity = frequency · wavelength	$v = f\cdot\lambda$
SPEED OF SOUND IN AIR	$V_{air} = 331$ m/s + (0.6 m/s) · Temperature in Celsius	$V_{air} = 331$ m/s + (0.6 m/s)T_c
ENERGY OF LIGHT	Photon Energy = Planck's Constant · frequency Photon Energy = $\frac{\text{Planck's Constant} \cdot \text{speed of light}}{\text{Wavelength}}$ $h = 6.63 \times 10^{-34}$ J-S $c = 3.0 \times 10^8$ m/s	$E = h \cdot f$ $E = \frac{h \cdot c}{\lambda}$