

SJ PAPERS

9TH & 10TH NUMERICALS ACCORDING TO ALP

| NUMERICAL 9TH | | | |
|--|---|---|--|
| CHAPTER # 01 | درجوں کی تعداد = 50 1.7 | -20h = -900 | $S_2 = Vxt$ |
| (a) 5000g 1.1 | سکریو کی پیچ = 0.5mm | h = -900/-20 | = 13.66x300 |
| $5 \times 10^3 g = 5kg$ | L.C = pitch/darje | h = 45m | = 4000m |
| (b) 2000000W | = 0.5/50 = 0.01cm | = t=3s | تین منٹ میں طے فاصلہ |
| = $2 \times 10^6 W = 2MW$ | 0.00309kg = 3 1.8 | پانچ سیکنڈ میں طے فاصلہ 2.5 | $V_i = 13.66m/s$ |
| (c) $52 \times 10^{-10} kg$ | $5.05 \times 10^{-27} = 3$ | $V_i = 40m/s$ | $V_f = 0$ |
| = $52 \times 10^{-10} \times 10^3 g$ | 1.009m 4 1.9 | t = 5s | t = 3mint = 3x60 |
| = $52 \times 10^{-7} g$ | 0.00450kg = 3 | $S_1 = Vxt$ | = 180s |
| = $5.2 \times 10^{-6} g$ | 1.66x10 ⁻²⁷ kg = 3 | $S_1 = 40 \times 5 = 200m$ | $V_{av} = V_f - V_i / 2$ |
| = 5.2ug | 2001s = 4 | دس سیکنڈ میں طے فاصلہ | = 0 + 13.66/2 |
| (d) $225 \times 10^{-10} s$ | لمبائی = 6.7cm 1.10 | $V_i = 40m/s$ | $V_{av} = 6.66m/s$ |
| = $2.25 \times 10^{-6} s$ | چوڑائی = 5.4cm | $V_f = 0$ | $S_3 = V_{av}xt$ |
| = 2.25us | رقبہ = LxW = 6.7x5.4 | t = 10s | = 6.66x180 |
| $1p = 10^{-12}$ / $1n = 10^{-9}$ | 36.78cm ² = 36cm ² | $V_{av} = V_f - V_i / 2$ | = 1200m |
| $1u = 10^{-6}$ / $1u = 10^3n$ | CHAPTER # 02 | = 0 + 40/2 = 20m/s | کل فاصلہ = $S_1 + S_2 + S_3$ |
| $1n = 10^3$ / $1u = 10^6p$ | V = 36km/h 2.1 | $S_2 = Vxt$ | = 800 + 4000 + 1200 |
| بال بڑھنے کی شرح 1.3 | = 36x1000m/3600 | $S_2 = 20 \times 10 = 200m$ | = 6000m |
| = V = d/t | V = 10m/s | کل فاصلہ = $S_1 + S_2$ | = 800 + 200 = 1000m |
| = 1mm/1 day | t = 10s | = 200 + 200 = 400m | اوپر جانے کا وقت 2.8 |
| = $1 \times 10^{-3} / 86400$ | S = Vxt | Retardation | t = 6/2 = 3s |
| = $1.157 \times 10^{-5} \times 10^{-3}$ | = 10x10 = 100m | $a_{av} = V_f - V_i / t$ | g = -10m/s ² |
| = 1.157×10^{-8} | $V_i = 0$ 2.2 | = 0 - 40/10 = -40/10 | = -4m/s ² |
| = 11.57×10^{-9} | S = 1000m | = -4m/s ² | $V_f = 0$ |
| = 11.57nm/s | t = 100s | $V_i = 0$ 2.6 | h = ? |
| (a) 1168×10^{-27} 1.4 | $V_f = ?$ | a = 0.5m/s ² | $V_f = V_i + gt$ |
| = $1.168 \times 10^{-27+3}$ | S = $V_i t + \frac{1}{2} at^2$ | S = 100m | 0 = $V_i + (-10) \times 3$ |
| = 1.168×10^{-24} | 1000 = 0x100 + $\frac{1}{2}$ | $V_f = ?$ | $V_i = 30m/s$ |
| (b) 32×10^5 | x a x (100) ² | 2aS = $V_f^2 - V_i^2$ | 2gh = $V_f^2 - V_i^2$ |
| = $3.2 \times 10^5 = 3.2 \times 10^6$ | a = 0.2m/s ² | 2(0.5)100 = $V_f^2 - (0)^2$ | 2(-10)h = (0)^2 - (30)^2 |
| (c) $725 \times 10^{-5} kg$ | $V_f = V_i + at$ | $V_f^2 = 100$ | -20xh = -900 |
| = $725 \times 10^{-5} \times 10^3 g$ | = 0 + 0.2x100 = 20m/s | $V_f = 10m/s^2$ | h = -900/-20 = 45m |
| = $725 \times 10^{-2} g$ | $V_i = 10m/s$ 2.3 | $V_f = 10 \times 3600 / 1000$ | S = 800m 2.9 |
| = 7.25g | a = 0.2m/s ² | $V_f = 36km/h$ | $V_i = 96km/h$ |
| (d) $0.02 \times 10^{-8} =$ | t = 30s | دو منٹ میں طے فاصلہ 2.7 | = 26.67m/s |
| $2 \times 10^{-8-2} = 2 \times 10^{-10}$ | S = ? | $V_i = 0$ | $V_f = 48km/h$ |
| (a) 6400km 1.5 | $V_f = ?$ | $V_f = 48km/h$ | = 13.33m/s |
| = $6.4 \times 10^3 km$ | $V_f = V_i + at^2$ | = 13.33m/s | 2xax800 = |
| (b) 380000km | = 10 + 0.2x30 | t = 2mint = 2x60 | (13.33) ² - (26.67) ² |
| = $3.8 \times 10^5 km$ | = 10 + 6 = 16m/s | = 120s | 1600xa = |
| (c) 300000000m/s | S = $V_i t + \frac{1}{2} at$ | $V_{av} = V_f - V_i / 2$ | 177.68 - 711.28 |
| = $3 \times 10^8 m/s$ | = 10x30 + $\frac{1}{2} 0.2(30)^2$ | = 0 + 13.33/2 | a = -533.6/1600 |
| (d) ایک دن میں سیکنڈ = | = 300 + $\frac{1}{2} 0.2 \times 900$ | = 6.66m/s | = -0.3335m/s ² |
| = 24x60x60s | = 300 + 90 = 390m | $S_1 = V_{av}xt$ | اس ایکسپریشن سے طے فاصلہ |
| = 86400s | $V_i = 30m/s$ 2.4 | = 6.66x120 | $V_i = 13.33m/s$ |
| = $8.64 \times 10^4 s$ | $V_f = 0$ | = 800m | $V_f = 0$ |
| زیر دایر = 0.01x4 1.6 | g = -10m/s ² | پانچ منٹ میں طے فاصلہ | a = -0.3335m/s ² |
| = 0.04cm | h = ? | V = 13.33m/s | S = ? |
| زیر و کوریکشن = -0.04cm | 2gh = $V_f^2 - V_i^2$ | t = 5mint = 5x60 | 2aS = $V_f^2 - V_i^2$ |
| | 2(-10)h = (0) ² - (30) ² | = 300s | 2x(-0.3335)xS = |
| | | | (0) ² - (13.33) ² |

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| $0.667xS = -177.66$ $S = -177.66/-0.667$ $S = 266.4m$ <hr/> $V_i = 26.67m/s$ 2.10 $V_f = 0$ $a = -0.3335m/s^2$ $V_f = V_i + at$ $t = (V_f - V_i)/a$ $t = 0 - 26.67 / -0.3335$ $t = 80s$ CHAPTER # 03 $F = 20N$ 3.1 $a = 2m/s^2$ $F = ma$ $m = F/a$ $= 20/2 = 10kg$ <hr/> $W = 147N$ 3.2 $g = 10m/s^2$ $W = mg$ $m = W/g$ $= 147/10 = 14.7kg$ <hr/> $m = 10kg$ 3.3 $g = 10m/s^2$ $W = mg > F$ $= 10 \times 10 = 100N$ <hr/> $F = 100N$ 3.4 $m = 50kg$ $F = ma$ $a = F/m$ $= 100/50 = 2m/s^2$ <hr/> $W = 20N$ 3.5 $a = 2m/s^2$ $g = 10m/s^2$ $W = mg$ $m = W/g$ $= 20/10 = 2kg$ $F = ma$ $= 2 \times 2 = 4N$ $ساری فورس = W + F$ $F = 20 + 4 = 24N$ <hr/> $m_1 = 52kg$ 3.6 $m_2 = 48kg$ $g = 10m/s^2$ $a = \frac{(m_1 - m_2)g}{m_1 + m_2}$ $= (52 - 48) \times 10 / 52 + 48$ $= 4 \times 10 / 100 = 40 / 100$ $a = 0.4m/s^2$ $T = \frac{2m_1m_2g}{m_1 + m_2}$ | $= 2 \times 52 \times 48 \times 10 / 100$ $= 49920 / 100$ $T = 500N$ <hr/> $m_1 = 24kg$ 3.7 $m_2 = 26kg$ $g = 10m/s^2$ $a = \frac{m_1g}{m_1 + m_2}$ $= \frac{24 \times 10}{24 + 26}$ $a = 240 / 50 = 4.8m/s^2$ $T = \frac{m_1m_2g}{m_1 + m_2}$ $= \frac{24 \times 26 \times 10}{24 + 26}$ $T = 6240 / 50 = 125N$ <hr/> $\Delta P = 22Ns$ 3.8 $F = 20N$ $F = \Delta P / t$ $t = \Delta P / F = 22 / 20$ $t = 1.1s$ <hr/> $m = 5kg$ 3.9 $\mu = 0.6$ $F_s = \mu F = \mu mg$ $F_s = 0.6 \times 5 \times 10 = 30N$ $m = 0.5kg$ 3.10 $r = 50cm$ $r = 50 / 100 = 0.5m$ $v = 3m/s$ $F_c = mv^2 / r$ $= 0.5 \times (3)^2 / 0.5 = 9N$ CHAPTER # 04 $F_x = 10 - 4 = 6N$ 4.1 $F_y = 6N$ $F = \sqrt{F_x^2 + F_y^2}$ $F = \sqrt{6^2 + 6^2}$ $F = \sqrt{72} = 8.5N$ $\theta = \tan^{-1}(F_y / F_x)$ $\theta = \tan^{-1}(6/6)$ $\theta = \tan^{-1}(1) = 45^\circ$ <hr/> $F = 50N$ 4.2 $\theta = 30^\circ$ $F_x = F \cos \theta$ $= 50 \cos 30^\circ$ $= 50 \times 0.866 = 43.3N$ $F_y = F \sin \theta$ $= 50 \sin 30^\circ$ $= 50 \times 0.5 = 25N$ <hr/> $F_x = 12N$ 4.3 $F_y = 5N$ $F = \sqrt{F_x^2 + F_y^2}$ $F = \sqrt{12^2 + 5^2}$ $F = \sqrt{169} = 13N$ | $\theta = \tan^{-1}(F_y / F_x)$ $\theta = \tan^{-1}(5/12)$ $= 22.6^\circ$ <hr/> $F = 100N$ 4.4 $r = 10cm = 0.1m$ $\tau = rF$ $= 0.1 \times 100 = 10Nm$ <hr/> $F_x = 20N$ 4.5 $\theta = 30^\circ$ $F_x = F \cos \theta$ $F = F_x / \cos \theta$ $= 20 / \cos 30^\circ$ $= 20 / 0.866$ $= 23.1N$ <hr/> $F = 50N$ 4.6 $r = 16cm = 0.16m$ $کپل کا ٹارک =$ $\tau = 2rF$ $= 2 \times 0.16 \times 50 = 16Nm$ <hr/> $T_1 = 3.8N$ 4.7 $T_2 = 4.4N$ $W = T_1 + T_2$ $= 3.8 + 4.4 = 8.2N$ <hr/> $m_1 = 3kg$ 4.8 $m_2 = 5kg$ $T_1 = mg$ $= 3 \times 10 = 30N$ $T_2 = (m_1 + m_2)g$ $= (3 + 5) \times 10$ $= 80N$ <hr/> $F_1 = 200N$ 4.9 $r_1 = 20cm = 0.2m$ $F_2 = 150N$ $r_2 = ?$ $T_1 = T_2$ $F_1 r_1 = F_2 r_2$ $r_2 = F_1 r_1 / F_2$ $= 0.1 \times 200 / 150$ $= 0.133m = 13.3cm$ <hr/> $m = 10kg$ 4.10 $F_1 = mg$ $F_1 = 10 \times 10 = 100N$ $r_1 = 20cm = 0.2m$ $r_2 = 50cm = 0.5m$ $F_2 = ?$ $اٹنی کلاک وائز = کلاک وائز$ $F_2 r_2 = F_1 r_1$ $F_2 = F_1 r_1 / r_2$ $= 100 \times 0.2 / 0.5$ $= 20 / 0.5 = 40N$ | CHAPTER # 05 $m_1 = 1000kg$ 5.1 $m_2 = 1000kg$ $d = 0.5m$ $G = 6.67 \times 10^{-11} Nm^2/kg^2$ $F = Gm_1m_2/d^2$ $= G \times 10^3 \times 10^3 / (0.5)^2$ $= 6.67 \times 10^{-11} \times 10^6 / 0.25$ $= 26.7 \times 10^{-11+6}$ $= 26.7 \times 10^{-5}$ $= 2.67 \times 10^{-4} N$ <hr/> $m = m_1 = m_2 = ?$ 5.2 $F = 0.006673N$ $d = 1m$ $G = 6.67 \times 10^{-11} Nm^2/kg^2$ $F = Gm_1m_2/d^2$ $m^2 = Fd^2/G$ $= \frac{0.006673(1)^2}{6.673 \times 10^{-11}}$ $= \frac{6.673 \times 10^{-3}}{6.673 \times 10^{-11}}$ $m^2 = 1 \times 10^{-3+11}$ $= 10^8$ $\sqrt{m^2} = \sqrt{10^8}$ $m = 10000kg$ <hr/> $M_m = 6.42 \times 10^{23} kg$ $R_m = 3370km$ 5.3 $= 3.370 \times 10^6 m$ $G = 6.67 \times 10^{-11} Nm^2/kg^2$ $g_m = GM_m / R_m^2$ $= \frac{6.673 \times 10^{-11} \times 6.42 \times 10^{23}}{(3.370 \times 10^6)^2}$ $= \frac{42.84 \times 10^{23-11}}{11.35 \times 10^{12}}$ $= 3.77 \times 10^{12-12}$ $= 3.77 \times 10^0$ $g_m = 3.77m/s^2$ <hr/> $g_m = 1.62m/s^2$ 5.4 $R_m = 1740km$ $= 1.740 \times 10^6 m$ $G = 6.67 \times 10^{-11} Nm^2/kg^2$ $M_m = g_m R_m^2 / G$ $= \frac{1.62 \times (1.74 \times 10^6)^2}{6.673 \times 10^{-11}}$ $= \frac{1.62 \times 3.027 \times 10^{12}}{6.673 \times 10^{-11}}$ $= 4.904712 \times 10^{12+11}$ $= 6.673$ $= 0.735 \times 10^{23}$ $M_m = 7.35 \times 10^{22} kg$ <hr/> $h = 3600km$ 5.5 $= 3.6 \times 10^6 m$ |
|--|--|---|--|

$$R = 6.4 \times 10^6 \text{m}$$

$$M_e = 6 \times 10^{24} \text{kg}$$

$$g_m = GM/(R+h)^2$$

$$= \frac{6.67 \times 10^{-11} \times 6 \times 10^{24}}{(6.4 \times 10^6 + 3.6 \times 10^6)^2}$$

$$= \frac{40.038 \times 10^{13}}{100 \times 10^{12}}$$

$$= 0.4 \times 10^{13-12}$$

$$= 0.4 \times 10^1$$

$$g_m = 4 \text{m/s}^2$$

$$R = 48700 \text{km} \quad 5.6$$

$$= 48.7 \times 10^6 \text{m}$$

$$g = GM/R^2$$

$$= \frac{6.67 \times 10^{-11} \times 6 \times 10^{24}}{(48.7 \times 10^6)^2}$$

$$= \frac{40.038 \times 10^{13}}{2371.69 \times 10^{12}}$$

$$= 0.017 \times 10^{13-11}$$

$$= 0.017 \times 10^2$$

$$g = 0.17 \text{m/s}^2$$

$$R = 10000 \text{km} \quad 5.7$$

$$= 10^7 \text{m}$$

$$g = 4 \text{m/s}^2$$

$$M_e = gR^2/G$$

$$= \frac{4 \times (10^7)^2}{6.67 \times 10^{-11}}$$

$$= 0.599 \times 10^{14+11}$$

$$= 0.599 \times 10^{25}$$

$$M = 5.99 \times 10^{24} \text{kg}$$

$$g_h = \frac{1}{4} g \quad 5.8$$

$$g_h = GM/(R+h)^2$$

$$(R+h)^2 = GM/g_h$$

$$= GM/ \frac{1}{4} g$$

$$(R+h)^2 = 4GM/g$$

دونوں طرف جذر لی

$$\sqrt{(R+h)^2} = \sqrt{4GM/g}$$

$$R+h = \sqrt{4R^2}$$

$$R+h = 2R$$

$$h = 2R-R$$

$$h = R$$

$$h = 850 \text{km} \quad 5.9$$

$$h = 0.85 \times 10^6 \text{m}$$

$$V_0 = (GM/R+h)^{1/2}$$

$$= \frac{(6.673 \times 10^{-11} \times 6 \times 10^{24})^{1/2}}{(0.85 \times 10^6 + 6.4 \times 10^6)^{1/2}}$$

$$= \frac{(40.038 \times 10^{13})^{1/2}}{[(0.85+6.4) \times 10^6]^{1/2}}$$

$$= \frac{(40.038 \times 10^{13-6})^{1/2}}{(7.25)^{1/2}}$$

$$= (5.522 \times 10^7)^{1/2}$$

$$= (55.22 \times 10^6)^{1/2}$$

$$= 7.431 \times 10^3$$

$$V_0 = 7431 \text{m/s}$$

$$h = 42000 \text{km} \quad 5.10$$

$$= 42 \times 10^6 \text{m}$$

$$V_0 = (GM/R+h)^{1/2}$$

$$= \frac{(6.673 \times 10^{-11} \times 6 \times 10^{24})^{1/2}}{(42 \times 10^6 + 6.4 \times 10^6)^{1/2}}$$

$$= \frac{(40.038 \times 10^{13})^{1/2}}{[(42+6.4) \times 10^6]^{1/2}}$$

$$= \frac{(40.038 \times 10^{13-6})^{1/2}}{(48.4)^{1/2}}$$

$$= (0.8272 \times 10^7)^{1/2}$$

$$= (8.272 \times 10^6)^{1/2}$$

$$= 2.876 \times 10^3$$

$$V_0 = 2876 \text{m/s}$$

CHAPTER # 06

$$F = 300 \text{N} \quad 6.1$$

$$d = 35 \text{m}$$

$$W = Fd$$

$$= 300 \times 35 = 10500 \text{J}$$

$$W = mg = 20 \text{N} \quad 6.2$$

$$h = 6 \text{m}$$

$$P.E = mgh$$

$$= 20 \times 6 = 120 \text{J}$$

$$W = 12 \text{kN} \quad 6.3$$

$$= 12000 \text{N}$$

$$V = 20 \text{m/s}$$

$$m = W/g \quad (w=mg)$$

$$= 12000/10 = 1200 \text{kg}$$

$$K.E = \frac{1}{2} mV^2$$

$$= \frac{1}{2} \times 1200 \times (20)^2$$

$$= 600 \times 400$$

$$= 240000$$

$$= 240 \times 10^3 = 240 \text{kJ}$$

$$m = 500 \text{g} \quad 6.4$$

$$= 0.5 \text{kg}$$

$$V = 15 \text{m/s}$$

$$K.E = \frac{1}{2} mV^2$$

$$= \frac{1}{2} \times 500 \times (0.5)^2$$

$$= 0.5 \times 225/2$$

$$K.E = 56.25 \text{J}$$

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$$P.E = 56.25 \text{J}$$

$$h = 6 \text{m} \quad 6.5$$

$$V = 1.5 \text{m/s}$$

$$m = 40 \text{kg}$$

$$P.E = mgh$$

$$= 40 \times 10 \times 6 = 2400 \text{J}$$

$$K.E = \frac{1}{2} mV^2$$

$$= \frac{1}{2} 40 \times (1.5)^2$$

$$= 20 \times 2.25 = 45 \text{J}$$

$$V = 4 \text{m/s} \quad 6.6$$

$$F = 4000 \text{N}$$

$$P = W/t = F.d/t$$

$$P = F.V = 4000 \times 4$$

$$= 16000 \text{W} = 16 \text{kW}$$

$$F = 300 \text{N} \quad 6.7$$

$$d = 50 \text{m}$$

$$t = 60 \text{s}$$

$$P = W/t = F.d/t$$

$$P = 300 \times 50/60$$

$$= 250 \text{W}$$

$$m = 50 \text{kg} \quad 6.8$$

$$t = 20 \text{s}$$

یڈر ہی کی لمبائی = 16cm

$$= 16/100 = 0.16 \text{m}$$

یڈر ہیوں کی تعداد = 25

$$h = 25 \times 0.16 = 4 \text{m}$$

$$P = W/t = mgh/t$$

$$= 50 \times 10 \times 4/20$$

$$= 100 \text{W}$$

$$m = 200 \text{kg} \quad 6.9$$

$$h = 6 \text{m}$$

$$t = 10 \text{s}$$

$$P = W/t = mgh/t$$

$$= 200 \times 10 \times 6/10$$

$$= 1200 \text{W}$$

$$P = 1 \text{hp} = 746 \text{W}$$

$$t = 10 \text{mint} = 600 \text{s}$$

$$m = 800 \text{kg} \quad 6.10$$

$$h = 15 \text{m}$$

$$W = Pxt \quad (P=W/t)$$

$$= 746 \times 600$$

$$\text{input} = 447600 \text{J}$$

$$W = mgh$$

$$= 800 \times 10 \times 15$$

$$\text{output} = 120000 \text{J}$$

$$E_f = (\text{output}/\text{input}) \times 100$$

$$= \frac{120000}{447600} \times 100$$

$$E_f = 26.8\%$$

CHAPTER # 07

$$m = 850 \text{g} \quad 7.1$$

$$= 850/1000 = 0.85 \text{kg}$$

$$V = 40 \text{cm} \times 10 \text{cm} \times 5 \text{cm}$$

$$= 40 \text{m} \times 10 \text{m} \times 5 \text{m}$$

$$= 100 \text{m} \times 100 \text{m} \times 100 \text{m}$$

$$= 0.4 \text{m} \times 0.1 \text{m} \times 0.05 \text{m}$$

$$V = 0.002 \text{m}^3$$

$$\rho = m/V$$

$$= 0.85/0.002$$

$$= 425 \text{kg/m}^3$$

$$m = 1 \text{L} = 1 \text{kg} \quad 7.2$$

$$\rho = 0.92 \text{kg/L}$$

$$V = m/\rho$$

$$= 1/0.92 = 1.09 \text{L}$$

$$(a) m = 5 \text{kg} \quad 7.3$$

$$\rho = 8200 \text{kg/m}^3$$

$$V = m/\rho = 5/8200$$

$$= 6.01 \times 10^{-4} \text{m}^3$$

$$(b) m = 200 \text{g}$$

$$= 200/1000 = 0.2 \text{kg}$$

$$\rho = 11300 \text{kg/m}^3$$

$$V = m/\rho = 0.2/11300$$

$$= 1.77 \times 10^{-5} \text{m}^3$$

$$(c) m = 0.2 \text{kg}$$

$$\rho = 19300 \text{kg/m}^3$$

$$V = m/\rho = 0.2/19300$$

$$= 1.04 \times 10^{-5} \text{m}^3$$

$$\rho = 1.3 \text{kg/m}^3 \quad 7.4$$

$$V = 8 \text{m} \times 5 \text{m} \times 4 \text{m}$$

$$= 160 \text{m}^3$$

$$m = \rho \times V$$

$$= 160 \times 1.3$$

$$= 208 \text{kg}$$

$$F = 75 \text{N} \quad 7.5$$

$$A = 1.5 \text{cm}^2$$

$$= \frac{1.5 \text{m} \times 1.5 \text{m}}{100 \times 100}$$

$$= 0.015 \text{m} \times 0.015 \text{m}$$

$$= 0.000225 \text{m}^2$$

$$P = F/A$$

$$= 75/0.000225$$

$$= 3.33 \times 10^5 \text{Pa}$$

$$L = 10 \text{mm} \quad 7.6$$

$$= 10/1000 = 0.01 \text{m}$$

$$A = L \times L = 0.01 \times 0.01$$

$$= 1 \times 10^{-4} \text{m}^2$$

$$F = 20 \text{N}$$

$$P = F/A = 20/10^{-4}$$

$$= 2 \times 10^5 \text{N/m}^2$$

$$m = 1000 \text{g} = 1 \text{kg} \quad 7.7$$

$$A = 7.5 \text{cm} \times 7.5 \text{cm}$$

$$= \frac{7.5 \text{m} \times 7.5 \text{m}}{100 \times 100}$$

$$= 0.075 \text{m} \times 0.075 \text{m}$$

$$A = 0.005625 \text{m}^2$$

$$F = mg$$

$$= 1 \times 10 = 10 \text{N}$$

$$P = F/A$$

$$= 10/0.005625$$

$$= 1778\text{N/m}^2$$


$$V = \frac{20\text{cm} \times 7.5\text{cm} \times 7.5\text{cm}}{100 \times 100 \times 100}$$

$$= 0.2\text{m} \times 0.075\text{m} \times 0.075\text{m}$$

$$V = 0.001125\text{m}^3$$

$$\rho = m/V$$

$$= 1/0.001125$$

$$= 888.89\text{kg/m}^3$$

کیوب کے ماس اور ڈینسٹی کے لحاظ سے اس کا اصل والیوم 7.8

$$m = 306\text{g}$$

$$\rho = 2.55\text{g/cm}^3$$

$$V_0 = m/\rho$$

$$= 306/2.55$$

$$= 120\text{cm}^3$$

کیوب کی شکل کی وجہ سے اس کا والیوم $V_s = 5 \times 5 \times 5 = 125\text{cm}^3$

کیوب کی والیوم $V_c = V_s - V_0$

$$V_c = 125 - 120 = 5\text{cm}^3$$

$$W_{\text{air}} = 18\text{N} \quad \text{7.9}$$

$$W_{\text{water}} = 11.4\text{N}$$

$$D = (W_{\text{air}}/W_{\text{air}} - W_{\text{wat}})/\rho$$

$$D = (18/6.6) \times 1000$$

$$= 2727\text{kg/m}^3 \quad (\text{AI})$$

$$W = 3.06\text{N} \quad \text{7.10}$$

$$m = W/g = 3.06/10$$

$$= 0.306\text{kg} = 306\text{g}$$

$$\rho = 0.6\text{g/cm}^3$$

(a) $V = m/\rho$

$$= 306/0.6 = 510\text{cm}^3$$

(b) $V = m/\rho$

$$= 306/0.9 = 340\text{cm}^3$$

$$F_2 = 20000\text{N} \quad \text{7.11}$$

پریس کے پمپن کا ایریا

$$D = 30\text{cm}$$

$$R = D/2 = 30/2$$

$$= 15\text{cm} = 0.15\text{m}$$

$$A = \pi R^2$$

$$= 3.14 \times (0.15)^2$$

$$= 0.07065\text{m}^2$$

پمپ کے پمپن کا ایریا

$$d = 3\text{cm}$$

$$r = d/2 = 3/2$$

$$= 1.5\text{cm} = 0.015\text{m}^2$$

$$a = \pi r^2$$

$$= 3.14 \times (0.015)^2$$

$$= 0.0007065\text{m}^2$$

$$F_2/A = F_1/a$$

$$F_1 = F_2 \times a/A$$

$$= 20000 \times 0.0007065$$

$$0.07065$$

$$F_1 = 14.13/0.07065$$

$$F_1 = 200\text{N}$$

$$A = 2 \times 10^{-5}\text{m}^2 \quad \text{7.12}$$

$$F = 4000\text{N}$$

اصل لمبائی = $L = 2\text{m}$

$$\Delta L = 2\text{mm}$$

$$= 2/1000 = 0.002\text{m}$$

$$Y = FxL/Ax\Delta L$$

$$= 4000 \times 2/2 \times 10^{-5} \times 0.002$$

$$= 8000/4 \times 10^{-8}$$

$$Y = 2 \times 10^{11}\text{N/m}^2$$

CHAPTER # 08

$$C = 50^\circ\text{C} \quad \text{8.1}$$

$$F = 1.8^\circ\text{C} + 32$$

$$= 1.8 \times 50 + 32$$

$$F = 122^\circ\text{F}$$

$$F = 98.6^\circ\text{F} \quad \text{8.2}$$

$$C = (F - 32)/1.8$$

$$= (98.6 - 32)/1.8$$

$$= 37^\circ\text{C}$$

$$K = C + 273$$

$$= 37 + 273$$

$$= 310\text{K}$$

$$L_0 = 2\text{m} \quad \text{8.3}$$

$$T_1 = 0^\circ\text{C} = 273\text{K}$$

$$T_2 = 20^\circ\text{C} = 293\text{K}$$

$$\alpha = 2.5 \times 10^{-5}\text{K}^{-1}$$

$$\Delta L = \alpha L_0(T_2 - T_1)$$

$$= 2.5 \times 10^{-5} \times 2 \times (293 - 273)$$

$$= 2.5 \times 10^{-5} \times 2 \times (20)$$

$$= 2.5 \times 40 \times 10^{-5}$$

$$= 100/10^5$$

$$= 0.001\text{m} = 0.1\text{cm}$$

$$V_0 = 1.2\text{m}^3 \quad \text{8.4}$$

$$T_1 = 15^\circ\text{C} = 288\text{K}$$

$$T_2 = 40^\circ\text{C} = 313\text{K}$$

$$\beta = 3.67 \times 10^{-3}\text{K}^{-1}$$

$$V = V_0(1 + \beta \Delta T)$$

$$= 1.2[1 + 3.67 \times 10^{-3}(313 - 288)]$$

$$= 1.2[1 + 3.67 \times 10^{-3}(25)]$$

$$= 1.2[1 + 0.09175]$$

$$V = 1.3\text{m}^3$$

$$m = 0.5\text{kg} \quad \text{8.5}$$

$$T_1 = 10^\circ\text{C} = 283\text{K}$$

$$T_2 = 65^\circ\text{C} = 338\text{K}$$

$$C = 4200\text{J/kgK}$$

$$\Delta Q = Cm\Delta T$$

$$= 0.5 \times 4200(338 - 283)$$

$$= 05 \times 4200 \times 55$$

$$\Delta Q = 115500\text{J}$$

$$\Delta Q = 1000\text{J/s} \quad \text{8.6}$$

$$m = 200\text{g} = 0.2\text{kg}$$

$$T_1 = 20^\circ\text{C} = 293\text{K}$$

$$T_2 = 90^\circ\text{C} = 363\text{K}$$

$$Q = Cm\Delta T/t$$

$$t = 4200 \times 0.2(363 - 293)/Q$$

$$t = 840(70)/1000$$

$$t = 58800/1000$$

$$t = 58.8\text{s}$$

$$\Delta Q = 50000\text{J} \quad \text{8.7}$$

$$H_f = 336000\text{K/kg}$$

$$m = \Delta Q/H_f \quad (\Delta Q = H_m)$$

$$m = 50000/336000$$

$$= 0.149\text{kg}$$

$$= 150\text{g}$$

$$m = 100\text{g} = 0.1\text{kg}$$

برف کو گرم کرنے کے لیے درکار حرارت

$$Q_1 = Cm\Delta T \quad (-10 \rightarrow 0)$$

$$= 2100 \times 0.1[0 - (-10)]$$

$$Q_1 = 2100\text{J} \quad \text{8.8}$$

برف کو پگھلانے کے لیے درکار حرارت

$$Q_2 = mH_f \quad (@ 0^\circ\text{C})$$

$$= 0.1 \times 336000$$

$$Q_2 = 33600\text{J}$$

پانی کو گرم کرنے کے لیے درکار حرارت

$$Q_3 = Cm\Delta T \quad (0 \rightarrow 10)$$

$$= 4200 \times 0.1(10 - 0)$$

$$Q_3 = 4200\text{J}$$

$$m_{\text{کل حرارت}} = Q_1 + Q_2 + Q_3$$

$$= 2100 + 33600 + 4200$$

$$Q = 39900\text{J}$$

$$m = 100\text{g} = 0.1\text{kg}$$

$$T = 100^\circ\text{C} \quad \text{8.9}$$

$$H_v = 2.26 \times 10^6\text{J/kg}$$

$$\Delta Q = mH_v$$

$$= 0.1 \times 2.26 \times 10^6$$

$$= 2.26 \times 10^5\text{J}$$

$$m_{\text{steam}} = 5\text{g} \quad \text{8.10}$$

$$= 5/1000 = 0.005\text{kg}$$

$$m_{\text{water}} = 500\text{g}$$

$$= 500/1000 = 0.5\text{kg}$$

پانی کی پھیلے ٹھہر چڑھنے سے آخری ٹھہر چڑھنے تک اپنے ماس کے لحاظ سے جذب کردہ حرارت

$$Q_p = Cm\Delta T$$

$$= Cm(T_2 - T_1)$$

$$= 2100 \times 0.5(T_2 - 10)$$

$$= 2100T_2 - 21000$$

ماس کے لحاظ سے بھاپ کی خارج کردہ حرارت

$$Q = mH_v$$

$$= 0.005 \times 2.26 \times 10^6$$

$$= 11300\text{J}$$

بھاپ کی پھیلے ٹھہر چڑھنے سے آخری ٹھہر چڑھنے تک جاتے ہوئے خارج کردہ حرارت

$$Q = Cm\Delta T$$

$$= 4200 \times 0.005(100 - T_2)$$

$$= Q = 2100 - 21T_2$$

پانی کی جذب کردہ حرارت = بھاپ کی خارج کردہ حرارت

$$2100T_2 - 2100 = 11300 + 2100 - 21T_2$$

$$11300 + 2100 - 21T_2 = 2100T_2 + 21T_2 = 11300 + 2100 + 21000$$

$$2121T_2 = 34400$$

$$T_2 = 34400/2121$$

$$T_2 = 16.21^\circ\text{C}$$

CHAPTER # 09

$$A = 200\text{m}^2 \quad \text{9.1}$$

$$L = 20\text{cm} = 0.2\text{m}$$

$$T_1 = 15^\circ\text{C} = 288\text{K}$$

$$T_2 = 35^\circ\text{C} = 308\text{K}$$

$$k = 0.65\text{W/mK}$$

$$Q/t = kA(T_2 - T_1)/L$$

$$= \frac{0.65 \times 200(308 - 288)}{0.2}$$

$$= 130 \times (20)/0.2$$

$$= 13000\text{J/s}$$

$$A = 2 \times 2.5 = 5\text{m}^2 \quad \text{9.2}$$

$$L = 0.8\text{cm} = 0.008\text{m}$$

$$t = 1\text{hr} = 3600\text{s}$$

$$T_1 = 5^\circ\text{C} = 278\text{K}$$

$$T_2 = 25^\circ\text{C} = 298\text{K}$$

$$k = 0.8\text{W/mK}$$

$$Q = kA(T_2 - T_1) \times t/L$$

$$= \frac{0.8 \times 5(298 - 278) \times 3600}{0.008}$$

$$= 4(20)3600/0.008$$

$$= 288000/0.008$$

$$= 36000000$$

$$Q = 3.6 \times 10^7\text{J}$$

PAKISTAN
LIVE LONG

NUMERICAL 10TH

CHAPTER # 10

$T = 2s$ 10.1

$g_e = 10m/s$
 $g_m = g_e/6 = 10/6$
 $= 1.67m/s$

$L = ?$

$T = 2\pi\sqrt{l/g}$

$T^2 = [2\pi\sqrt{l/g}]^2$

$T^2 = 4\pi^2 \times l/g$

$L = T^2 \times g / 4\pi^2$

زمین کے لیے لمبائی
 $L = (2)^2 \times 10 / 4(3.14)^2$
 $= 10 / 9.8596$
 $= 1.02m$

چاند کے لیے لمبائی
 $L = (2)^2 \times 1.67 / 4(3.14)^2$
 $= 1.67 / 9.8596$
 $= 0.17m$

$L = 0.99m$ 10.2

$T = 4.9s$

$T = 2\pi\sqrt{l/g}$

$T^2 = [2\pi\sqrt{l/g}]^2$

$T^2 = 4\pi^2 \times l/g$

$g = 4\pi^2 \times l / T^2$

$= 4(3.14)^2 \times 0.99 / (4.9)^2$
 $= 4(9.8596) / 24.01$
 $g = 1.63m/s^2$

$L = 1m$ 10.3

$g_e = 10m/s$
 $g_m = 1.67m/s$

$T = 2\pi\sqrt{l/g}$

زمین کی سطح پر قائم پیریزڈ

$T = 2(3.14)\sqrt{1/10}$

$= 6.28\sqrt{0.1} = 2s$

چاند کی سطح پر قائم پیریزڈ

$T = 2(3.14)\sqrt{1/1.6}$

$= 6.28\sqrt{0.598}$

$= 4.9s$

$T = 2s$ 10.4

$g = 10m/s^2$

$L = T^2 \times g / 4\pi^2$

$= (2)^2 \times 10 / 4(3.14)^2$

$L = 1.02m$

$t = 20s$ 10.5

دوپر کی تعداد = $n = 100$

$\lambda = 6cm = 0.06m$

$f = \text{وقت / دوپر کی تعداد} = n/t$

$f = 100/20 = 5Hz$

$T = 1/f$
 $= 1/5 = 0.2s$

$V = f\lambda$
 $= 5 \times 0.06 = 0.3m/s$

$f = 12Hz$ 10.6

$\lambda = 3cm = 0.03m$

$V = f\lambda$
 $= 12 \times 0.03 = 0.36m/s$

$f = 190Hz$ 10.7

$S = 90m$

$t = 0.5s$

(a) $T = 1/f$
 $T = 1/190 = 0.005s$

(b) $V = S/t$
 $V = 90/0.5 = 180m/s$

(c) $\lambda = V/f$
 $\lambda = 180/190 = 0.95m$

$f = 4.8Hz$ 10.8

$\lambda = 6cm = 0.06m$

(a) $V = f\lambda$
 $V = 4.8 \times 0.06$
 $= 0.29m/s$

(b) $T = 1/f$
 $T = 1/4.8 = 0.21s$

$f = 5Hz$ 10.9

$\lambda = 40mm$
 $= 40 \times 10^{-3}m$

$S = 80cm = 0.8m$

$V = f\lambda$
 $= 5 \times 40 \times 10^{-3}$
 $= 0.2m/s$

$t = S/V$ ($S=Vt$)
 $= 0.8/0.2 = 4s$

$f = 90MHz$ 10.10

$= 90 \times 10^6 Hz$

$V = 3 \times 10^8 m/s$

$\lambda = V/f$
 $= 3 \times 10^8 / 90 \times 10^6$
 $= 3.33m$

$\lambda = 3.33m$

CHAPTER # 11

$I = 3 \times 10^{-6} W/m^2$ 11.1

$I_0 = 10^{-12} W/m^2$

$S.L = 10 \log I / I_0 (dB)$

$= 10 \log (3 \times 10^{-6} / 10^{-12})$

$= 10 \log (3 \times 10^6)$

$= 10 [\log 3 + \log 10^6]$

$= 10 [\log 3 + 6 \log 10]$

$= 10 [0.4771 + 6(1)]$

$= 64.771 = 64.8dB$

(b) $S.L = 100dB$

$S.L = 10 \log I / I_0 (dB)$

$100 = 10 \log I / 10^{-12}$

$10 = \log I / 10^{-12}$

دونوں طرف اٹنی لاگ لیا

$10^{10} = I / 10^{-12}$

$10^{10} \times 10^{-12} = I$

$10^{-2} = I$

$I = 0.01 W/m^2$

$S.L = 80dB$ 11.2

$I_0 = 10^{-12} W/m^2$

$S.L = 10 \log I / I_0 (dB)$

$80 = 10 \log I / 10^{-12}$

$8 = \log I / 10^{-12}$

دونوں طرف اٹنی لاگ لیا

$10^8 = I / 10^{-12}$

$10^8 \times 10^{-12} = I$

$I = 10^{-4} W/m^2$

$V = 330m/s$ 11.3

$\lambda = 5cm = 0.05m$

$V = f\lambda$

$330 = f \times 0.05$

$f = 330/0.05$

$= 6.6 \times 10^3 Hz$

قابل سماعت ہے

$n = 72$ 11.4

$t = 60s$

(a) $f = n/t$
 $= 72/60 = 1.2Hz$

(b) $T = 1/f$
 $= 1/1.2 = 0.83s$

$T = 1.5s$ 11.5

$t = 1.5/2 = 0.75s$

$V = 1500m/s$

$S = Vt$
 $= 1500 \times 0.75$
 $= 1125m$

$T = 5s$ 11.6

$t = 5/2 = 2.5s$

$V = 346m/s$

$S = Vt$
 $= 346 \times 2.5$
 $= 865m$

$T = 3.42s$ 11.7

$t = 3.42/2 = 1.71s$

$V = 1531m/s$

$S = Vt$
 $= 1531 \times 1.71$

$= 2618m$

$V = 343m/s$ 11.8

$f = 20000Hz$

(a) $V = f\lambda$

$343 = 20000 \times \lambda$

$\lambda = 343/20000$

$\lambda = 1.7 \times 10^{-2}m$

(b) $V = f\lambda$

$343 = 20 \times \lambda$

$\lambda = 343/20 = 17.2m$

$f = 2kHz$ 11.9

$= 2000Hz$

$\lambda = 35cm = 0.35m$

$S = 1.5km = 1500m$

$V = f\lambda$

$= 2000 \times 0.35$

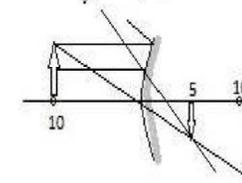
$= 700m/s$

$t = S/V$ ($S=Vt$)
 $= 1500/700 = 2.1s$

CHAPTER # 12

$p = 10cm$ 12.1

$q = -5cm$



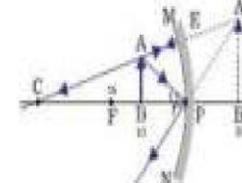
$1/f = 1/p + 1/q$
 $= 1/10 + 1/(-5)$

$f = -10cm$ (div-m)

$O = 30cm$ 12.2

$p = 10.5cm$

$f = 16cm$



$1/f = 1/p + 1/q$

$1/16 = 1/10.5 + 1/q$

$1/q = 1/16 - 1/10.5$

$= (10.5 - 16) / 16 \times 10.5$

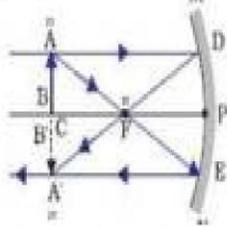
$1/q = -168/5.5$

$q = 30.54cm$ (con-m)

$I/O = q/p$

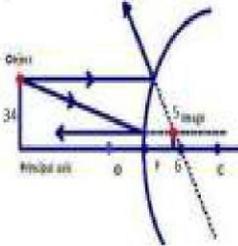
$I/O = 30.54/10.5$

$I = 87.26\text{cm}$
 $p = 20\text{cm}$ 12.3
 $I/O = q/p$
 $I/I = q/p$
 $1 = q/p$
 $q = p = 20\text{cm}$



$1/f = 1/p + 1/q$
 $= 1/20 + 1/20$

$f = 10\text{cm}$
 $p = 34.4\text{cm}$ 12.4
 $q = -5.66\text{cm}$ (div-m)



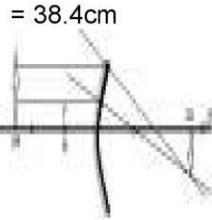
$1/f = 1/p + 1/q$
 $= 1/34.4 + 1/(-5.66)$
 $= (5.66 - 34.4)/34.4 \times 5.66$
 $f = -194.7/28.74$
 $= -6.77\text{cm}$ (div-m)

$f = -13.5\text{cm}$ 12.5
 $q = -11.5\text{cm}$



$1/f = 1/p + 1/q$
 $1/(-13.5) = 1/p + 1/(-11.5)$
 $1/p = 1/11.5 - 1/13.5$
 $= (13.5 - 11.5)/11.5 \times 13.5$
 $p = 155.25/2$
 $= 77.62\text{cm}$

$f = -8.70\text{cm}$ 12.6
 $O = 13.2\text{cm}$
 $p = 19.3\text{cm}$
 $p = 2p = 2(19.3)$

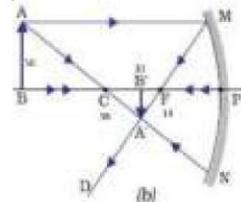


$= 38.4\text{cm}$
 $1/f = 1/p + 1/q$
 $1/(-8.70) = 1/19.3 + 1/q$
 $1/q = 1/8.70 + 1/19.3$
 $= (19.3 - 8.70)/8.70 \times 19.3$
 $q = 167.91/10.6$
 $= 15.84$

(b) $I/O = q/p$
 $I/13.2 = 16.84/19.3$
 $I = 10.8\text{cm}$

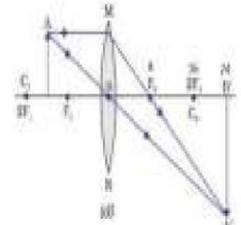
(c) $I/O = q/p$
 $I/13.2 = 15.84/38.4$
 $I = 5.42\text{cm}$

$R = 38\text{cm}$ 12.7
 $f = R/2 = 38/2$
 $= 19\text{cm}$
 $p = 50\text{cm}$



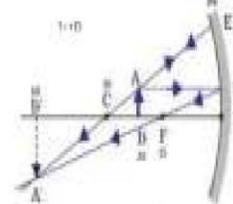
$1/f = 1/p + 1/q$
 $1/19 = 1/50 + 1/q$
 $1/q = 1/19 - 1/50$
 $= (50 - 19)/19 \times 50$
 $q = 950/31$
 $= 30.64\text{cm}$

اشیاء سیدھی ہوگی
 $O = 4\text{cm}$ 12.8
 $p = 12\text{cm}$
 $f = 8\text{cm}$



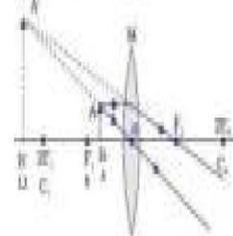
$1/f = 1/p + 1/q$
 $1/8 = 1/12 + 1/q$

$1/q = (6-4)/48$
 $q = 24\text{cm}$
(b) $I/O = q/p$
 $I/4 = 24/12$
 $I = 8\text{cm}$



$O = 10\text{cm}$ 12.9
 $p = 20\text{cm}$
 $f = -15\text{cm}$
 $1/f = 1/p + 1/q$
 $1/(-15) = 1/20 + 1/q$
 $1/q = (-4-3)/60$
 $q = -8.75\text{cm}$
 $I/O = q/p$
 $I/10 = 8.75/20$
 $I = 4.28\text{cm}$

اشیاء درچوئک، سیدھی، بڑی
 $f = 6\text{cm}$ 12.10
 $q/p = 3/1$
 $q = 3p = -3p$

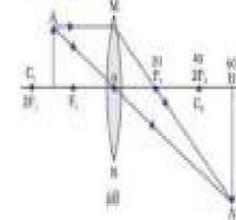


$1/f = 1/p + 1/q$
 $1/6 = 1/p + 1/(-3p)$
 $p = 4\text{cm}$

$f = 35^\circ$ 12.11
 $n = 1.25$

(a) $n = \text{Sin}i/\text{Sin}r$
 $1.25 = \text{Sin}35^\circ/\text{Sin}r$
 $\text{Sin}r = 0.57/1.25$
 $\text{Sin}r = 0.45$
 $r = \text{Sin}^{-1}(0.45)$
 $r = 27.32^\circ$
(b) $n = \text{Sin}i/\text{Sin}r$
 $1.25 = \text{Sin}e/\text{Sin}90^\circ$

$\text{Sin}e = \text{Sin}90^\circ/1.25$
 $\text{Sin}e = 0.80$
 $e = \text{Sin}^{-1}(0.80)$
 $= 53.13^\circ$
 $P = 5D$ 12.12
 $f = 1/P$
 $= 1/5 = 0.2\text{m}$
 $f = 20\text{cm}$
 $q/p = 2/1$
 $q = 2p$



$1/f = 1/p + 1/q$
 $1/20 = 1/p + 1/2p$
 $p = 30\text{cm}$

CHAPTER # 13
 $Q = 100\mu\text{C}$ 13.1
 $= 100 \times 10^{-6}\text{C} = 10^{-4}\text{C}$
 $e^- = 1.6 \times 10^{-19}\text{C}$
 $n = Q/e$ ($Q = ne$)
 $= 10^{-4}/1.6 \times 10^{-19}$
 $= 0.625 \times 10^{-4+19}$
 $n = 6.25 \times 10^{14}$

$q_1 = 10\mu\text{C}$ 13.2
 $= 10 \times 10^{-6}\text{C} = 10^{-5}\text{C}$
 $q_2 = 5\mu\text{C} = 5 \times 10^{-6}\text{C}$
 $r = 150\text{cm} = 1.5\text{m}$
 $k = 9 \times 10^9 \text{Nm}^2/\text{C}^2$
 $F = kq_1q_2/r^2$
 $= 9 \times 10^9 \times 10^{-5} \times 5 \times 10^{-6}$
 $(1.5)^2$
 $= 45 \times 10^{-5-6}/2.25$
 $F = 20 \times 10^{-2} = 0.2\text{N}$
 دفع کی فورس، مثبت چارجز

$F = 0.8\text{N}$ 13.3
 $r = 0.1\text{m}$
 $k = 9 \times 10^9 \text{Nm}^2/\text{C}^2$
 $F = kq_1q_2/r^2$
 $0.8 = 9 \times 10^9 \times q^2/(0.1)^2$
 $q^2 = 0.8 \times 0.01/9 \times 10^9$
 $= 8 \times 10^{-3}/9 \times 10^9$
 $= 0.888 \times 10^{-12}$
 $\sqrt{q^2} = \sqrt{0.888 \times 10^{-6}}$
 $q = 0.942 \times 10^{-6}$
 $= 9.42 \times 10^{-7}\text{C}$

$$F = 0.1N \quad \boxed{13.4}$$

$$r = 5cm = 0.05m$$

$$k = 9 \times 10^9 Nm^2/C^2$$

$$F = kq_1q_2/r^2$$

$$q^2 = Fr^2/k$$

$$= 0.1 \times (0.05)^2 / 9 \times 10^9$$

$$= 0.1 \times 0.0025 \times 10^{-9} / 9$$

$$q^2 = 2.8 \times 10^{-5} \times 10^{-9}$$

$$= 2.8 \times 10^{-14} C$$

Now if

$$r = 2cm = 0.02m$$

$$q^2 = 2.8 \times 10^{-14} C$$

$$F = kq_1q_2/r^2$$

$$= \frac{9 \times 10^9 \times 2.8 \times 10^{-14}}{(0.02)^2}$$

$$= (25.2/0.0004) \times 10^{9-14}$$

$$= 63000 \times 10^{-5}$$

$$F = 0.63N$$

$$V = 10^4 V \quad \boxed{13.5}$$

$$q = 100 \mu C$$

$$= 100 \times 10^{-6} = 10^{-4} C$$

$$V = W/q$$

$$10^4 = W/10^{-4}$$

$$W = 10^4 \times 10^{-4} = 10^0$$

$$W = 1J$$

$$q = +2C \quad \boxed{13.6}$$

$$V_a = 100V$$

$$V_b = 50V$$

$$W = q(V_a - V_b)$$

$$= 2(100 - 50) = 100J$$

$$V_b = 9V \quad \boxed{13.7}$$

$$Q = 0.06C$$

$$Q = CV$$

$$0.06 = 9 \times C$$

$$C = 0.06/9$$

$$= 6.67 \times 10^{-3} F$$

$$Q_1 = 0.03C \quad \boxed{13.8}$$

$$V_1 = 6V$$

$$Q_2 = 2C$$

$$C = C$$

$$Q_1/V_1 = Q_2/V_2$$

$$V_2 = Q_2 \times V_1 / Q_1$$

$$= 2 \times 6 / 0.03 = 400V$$

$$C_1 = 6 \mu C \quad \boxed{13.9}$$

$$C_2 = 12 \mu C$$

$$V = 12V$$

$$1/C_{eq} = 1/C_1 + 1/C_2$$

$$= 1/6 + 1/12 = 4 \mu C$$

سیریز میں تمام کپیسٹرز پر چارج ایک جیسا ہوگا

$$Q = C_{eq} V$$

$$= 4 \times 10^{-6} \times 12$$

$$= 48 \times 10^{-6} = 48 \mu C$$

$$V_1 = Q/C_1$$

$$= 48 \times 10^{-6} / 6 \times 10^{-6}$$

$$= 8V$$

$$V_2 = Q/C_2$$

$$= 48 \times 10^{-6} / 12 \times 10^{-6}$$

$$= 4V$$

$$C_1 = 6 \mu C \quad \boxed{13.10}$$

$$C_2 = 12 \mu C$$

$$V = 12V$$

$$C_{eq} = C_1 + C_2$$

$$= 6 + 12 = 18 \mu F$$

سیریز میں ہر کپیسٹرز پر پوٹینشل ایک جیسا ہوگا

$$p.d = 12V$$

$$Q_1 = C_1 V$$

$$= 6 \mu \times 12 = 72 \mu C$$

$$Q_2 = C_2 V$$

$$= 12 \mu \times 12 = 144 \mu C$$

CHAPTER # 14

$$I = 3mA \quad \boxed{14.1}$$

$$= 3 \times 10^{-3} A$$

$$t = 1mint = 60s$$

$$I = Q/t$$

$$3 \times 10^{-3} = Q/60$$

$$Q = 60 \times 3 \times 10^{-3}$$

$$= 180 \times 10^{-3} C$$

ننگ جلد سے کرنٹ

$$R = 100000 \Omega$$

$$V = 12V$$

$$V = IR$$

$$12 = I \times 10^5$$

$$I = 12/10^5$$

$$= 1.2 \times 10^{-4} A$$

گیلی جلد سے کرنٹ

$$R = 10000 \Omega$$

$$V = 12V$$

$$V = IR$$

$$12 = I \times 1000$$

$$I = 12/1000$$

$$= 1.2 \times 10^{-2} A$$

$$R = 10M \Omega \quad \boxed{14.2}$$

$$= 10 \times 10^6 \Omega$$

$$V = 100V$$

$$V = IR$$

$$100 = I \times 10^7$$

$$I = 100/10^7 = 1/10^5$$

$$= 1/10^2 \times 10^3$$

$$= (1/100) \times 10^{-3}$$

$$= 0.01mA$$

$$V = 10V \quad \boxed{14.3}$$

$$I = 1.5A$$

$$t = 2mint = 120s$$

$$R = V/I = 10/1.5$$

$$= 6.667 \Omega$$

$$W = I^2 R t$$

$$= (1.5)^2 \times 6.667 \times 120$$

$$W = 1800J$$

$$R_1 = 2k \Omega \quad \boxed{14.4}$$

$$R_2 = 8k \Omega$$

$$V = 10V$$

(a) $R_e = R_1 + R_2$
 $= 2 + 8 = 10k \Omega$

(b) سیریز میں ہر رزسٹنس پر کرنٹ ایک جیسا ہوگا

$$V = IR_e$$

$$10 = I \times 10 \times 10^3$$

$$I = 1 \times 10^{-3} = 1mA$$

(c) $V_1 = IR_1$
 $= 1 \times 10^{-3} \times 2 \times 10^3$
 $= 2V$

$$V_2 = IR_2$$

$$= 1 \times 10^{-3} \times 8 \times 10^3$$

$$= 8V$$

$$R_1 = 6k \Omega \quad \boxed{14.5}$$

$$R_2 = 12k \Omega$$

$$V = 6V$$

(a) $1/R_e = 1/R_1 + 1/R_2$
 $= 1/6 + 1/12 = 4k \Omega$

(b) سیریز میں ہر رزسٹنس کے گرد پوٹینشل ایک جیسا ہوگا

$$V = 6V$$

(c) $V = I_1 R_1$
 $6 = I_1 \times 6 \times 10^3$
 $I_1 = 6/6 \times 10^3 = 1mA$
 $V = I_2 R_2$
 $6 = I_2 \times 12 \times 10^3$
 $I_2 = 6/12 \times 10^3 = 0.5mA$

$$V = 220V \quad \boxed{14.6}$$

$$P = 100W$$

$$Hours = 5$$

$$Days = 30$$

$$t = 5 \times 30 = 150h$$

$$P = VI = V(V/R)$$

$$P = V^2/R$$

$$100 = (220)^2/R$$

$$R = 48400/100$$

$$= 484 \Omega$$

$$E = PxHours/1000$$

$$= 100 \times 150 / 1000$$

$$= 15kWh$$

$$P = 150W \quad \boxed{14.7}$$

$$R = 95 \Omega$$

$$P = VI = V(V/R)$$

$$P = V^2/R$$

$$150 = V^2/95$$

$$V^2 = 150 \times 95$$

$$V^2 = 14250$$

$$\sqrt{V^2} = \sqrt{14250}$$

$$V = 120V$$

بلبوں کے صرف شدہ پوٹنٹس

$$P = 10 \times 60 = 600W$$

$$t = 5 \times 30 = 150h$$

$$E_b = P_xh/1000$$

$$= 600 \times 150 / 1000$$

$$= 90kWh \quad \boxed{14.8}$$

پنکھوں کے صرف شدہ پوٹنٹس

$$P = 4 \times 75 = 300W$$

$$t = 10 \times 30 = 300h$$

$$E_p = P_xh/1000$$

$$= 300 \times 300 / 1000$$

$$= 90kWh$$

ٹی وی کے صرف شدہ پوٹنٹس

$$P = 1 \times 250 = 250W$$

$$t = 2 \times 30 = 60h$$

$$E_t = P_xh/1000$$

$$= 250 \times 60 / 1000$$

$$= 15kWh$$

اسٹری کے صرف شدہ پوٹنٹس

$$P = 1 \times 1000 = 1000W$$

$$t = 2 \times 30 = 60s$$

$$E_i = P_xh/1000$$

$$= 1000 \times 60 / 1000$$

$$= 60kWh$$

$$U_T = E_b + E_p + E_t + E_i$$

$$= 90 + 90 + 15 + 60$$

$$= 225kWh$$

نی پوٹنٹس قیمت = $R_s = 4$

$$بل = 4 \times 225 = 1020/-$$

بلب کے کرنٹ، رزسٹنس

$$P = 100W \quad \boxed{14.9}$$

$$V = 250V$$

(a) $P = VI$
 $100 = 250 \times I$
 $I = 100/250 = 0.4A$

(b) $V = IR$
 $250 = 0.4 \times R$

$$R = 250/0.4 = 625\Omega$$

ہیٹر کے کرنٹ، رزسٹنس

$$P = 4kW = 4000W$$

$$V = 250V$$

$$(a) P = VI$$

$$4000 = 250 \times I$$

$$I = 4000/250 = 16A$$

$$(b) V = IR$$

$$250 = 16 \times R$$

$$R = 250/16 = 15.6\Omega$$

$$R = 5.6\Omega \quad 14.10$$

$$V = 3V$$

$$I = 0.5A$$

$$(a) P_r = I^2R$$

$$= (0.5)^2 \times 5.6$$

$$= 1.4W$$

$$(b) P_b = VI$$

$$= 3 \times 0.5$$

$$= 1.5W$$

کچھ پاور ہیٹری کے اندرونی

رزسٹنس کی وجہ سے ضائع ہو جاتی

ہے

CHAPTER # 15

$$V_p = 240V \quad 15.1$$

$$V_s = 12V$$

$$N_p = 2000$$

$$N_s/N_p = V_s/V_p$$

$$N_s/2000 = 12/240$$

$$N_s = 12 \times 2000/240$$

$$= 100$$

$$N_p = 1 \quad 15.2$$

$$N_s = 100 \quad (\text{step-up})$$

$$V_p = 20V$$

$$N_s/N_p = V_s/V_p$$

$$100/1 = V_s/20$$

$$V_s = 100 \times 20/1$$

$$= 2000V$$

$$N_p = 100 \quad 15.3$$

$$N_s = 1 \quad (\text{step-down})$$

$$V_p = 170V$$

$$I_p = 1mA = 1 \times 10^{-3}A$$

$$N_s/N_p = V_s/V_p$$

$$1/100 = V_s/170$$

$$V_s = 1 \times 170/100$$

$$= 1.7V$$

ان پٹ پاور = آؤٹ پٹ پاور

$$V_s I_s = V_p I_p$$

$$1.7 \times I_s = 170 \times 1 \times 10^{-3}$$

$$I_s = 170 \times 10^{-3} / 1.7$$

$$= 0.1A$$

$$V_p = 240V \quad 15.4$$

$$V_s = 12V$$

$$N_p = 4000$$

$$I_s = 0.4A$$

$$N_s/N_p = V_s/V_p$$

$$N_s/4000 = 12/240$$

$$N_s = 12 \times 4000/240$$

$$= 200$$

ان پٹ پاور = آؤٹ پٹ پاور

$$V_s I_s = V_p I_p$$

$$12 \times 0.4 = 240 \times I_p$$

$$I_p = 12 \times 0.4 / 240$$

$$= 0.02A$$

$$P = 500MW \quad 15.5$$

$$= 500 \times 10^6 W$$

$$V = 250kV$$

$$= 250 \times 10^3 V$$

$$P = VI$$

$$500 \times 10^6 = 250 \times 10^3 I$$

$$I = 500 \times 10^6 / 250 \times 10^3$$

$$= 2 \times 10^3 A$$

$$P_{gen} = 150kW \quad 15.6$$

$$= 150 \times 10^3 W$$

$$V_{wire} = 10000V$$

$$R = 2\Omega$$

$$S = 5km = 5000m$$

تار میں پاور ہیزیٹی کی وجہ سے

$$P_{gen} = P_{wire}$$

$$150 \times 10^3 = V_w I_w$$

$$150 \times 10^3 = 10000 \times I_w$$

$$I_w = 150 \times 10^3 / 10000$$

$$= 15A$$

تار میں ضائع ہونے والا ووٹیج یا

ووٹیج ڈراپ

$$V_d = I_w R$$

$$= 15 \times 2 = 30V$$

تار میں ضائع ہونے والی پاور

$$P_{loss} = V_d I_w$$

$$= 30 \times 15 = 450W$$

شہر کے ٹرانسمر کو تار سے جو

ووٹیج ملا

$$V_T = V_{in} - V_d$$

$$= 10000 - 30$$

$$= 9970V$$

CHAPTER # 18

$$T_{1/2} = 7.3s \quad 18.1$$

$$T_p = 29.2s$$

$$T_p = nT_{1/2}$$

$$29.2 = n \times 7.3$$

$$n = 29.2/7.3 = 4$$

$$N = N_0/2^n$$

$$= N_0/2^4 = N_0/16$$

سولہ واں حصہ باقی رہ جائے گا

$$T_{1/2} = 5.25Y \quad 18.2$$

$$T_p = 26Y$$

$$T_p = nT_{1/2}$$

$$26 = n \times 5.25$$

$$n = 26/5.25 = 5$$

$$N = N_0/2^n$$

$$= N_0/2^5 = N_0/32$$

بیس واں حصہ باقی رہ جائے گا

$$T_{1/2} = 5730Y \quad 18.3$$

اصل مقدار = N_0

$$\text{باقی مقدار} = N = N_0/8$$

$$N = N_0/2^n$$

$$N_0/8 = N_0/2^n$$

$$1/2^3 = 1/2^n$$

$$2^3 = 2^n$$

$$n = 3$$

$$T_p = nT_{1/2}$$

$$= 3 \times 5730$$

$$= 17190$$

$$= 1.7 \times 10^4 Y$$

$$T_{1/2} = 6h \quad 18.4$$

$$T_p = 36h$$

$$T_p = nT_{1/2}$$

$$36 = n \times 6$$

$$n = 36/6 = 6$$

اصل مقدار = N_0

$$\text{باقی مقدار} = N$$

$$N = N_0/2^n$$

$$= 200/2^6$$

$$= 200/64$$

$$= 3.12mg$$

$$T_{1/2} = 10mint \quad 18.5$$

اصل مقدار = N_0

$$= 368c/m$$

$$\text{باقی مقدار} = N = 23c/m$$

$$N = N_0/2^n$$

$$23 = 368/2^n$$

$$2^n = 368/23$$

$$2^n = 16$$

$$2^n = 2^4$$

$$n = 4$$

$$T_p = nT_{1/2}$$

$$= 4 \times 10$$

$$= 40mint$$

دو ہاف لائف کے بعد

$$T_p = 4mint \quad 18.6$$

$$T_p = nT_{1/2}$$

$$4 = 2 \times T_{1/2}$$

$$T_{1/2} = 4/2 = 2mint$$

$$T_{1/2} = 1500Y \quad 18.7$$

اصل مقدار = N_0

$$= 32000c/m$$

باقی مقدار = $N = N_0/16$

$$N = N_0/2^n$$

$$N_0/16 = N_0/2^n$$

$$16 = 2^n$$

$$2^4 = 2^n$$

$$n = 4$$

$$T_p = nT_{1/2}$$

$$= 4 \times 1500$$

$$= 6000Y$$

$$T_{1/2} = 4000Y \quad 18.8$$

$$t = 8h$$

$$C.R = 310, 300, 280,$$

$$270, 312, 305, 290$$

کاونٹ ریٹ میں بے ترتیبی ظاہر کرتی

ہے کہ اس کی ہاف لائف چار ہزار

بہت زیادہ ہے اور مشاہدہ کا نام آٹھ

گھنٹے بہت کم ہے

$$\text{اصل مقدار} = N_0 \quad 18.9$$

باقی مقدار = $N = N_0/8$

$$T_{1/2} = 5730Y$$

$$N = N_0/2^n$$

$$N_0/8 = N_0/2^n$$

$$1/8 = 1/2^n$$

$$8 = 2^n$$

$$n = 3$$

$$T_p = nT_{1/2}$$

$$= 3 \times 5730$$

$$= 17190Y$$

SJ THOUGHTS



مدت قلم سے اگر شہد بھین نیک جائے
حرف شور مچائیں گے زور ہے لوگوں۔

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