

## SCHEME OF VALUATION

### (Scoring Indicators)

Revision: <b>2015</b>		Course Code: <b>1003</b>		
Course Title: ENGINEERING PHYSICS I				
Qst. No	Scoring Indicator	Split up score	Sub Total	Total
<b>Part A</b>				
I (1)	Any two advantages (Universally accepted, Coherent, Comprehensive etc..)	2		2
I (2)	Definition of resultant Definition of equilibrant	1 1		2
I(3)	Definition of Streamline flow Definition of turbulent flow	1 1		2
I(4)	Definition of SHM Differential equation[ $d^2y/dt^2 = -\omega^2y$ ]	1 1		2
I(5)	$V = \lambda/T$ . Since $1/T = f$ ; $V = f\lambda$ .	1 1		2
<b>Part B</b>				
II(1)	Statement of conservation of linear momentum $A = (m_2v_2 - m_2u_2)/t$ and $R = (m_1v_1 - m_1u_1)/t$ $A = -R$ $(m_2v_2 - m_2u_2)/t = - (m_1v_1 - m_1u_1)/t$ $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$	1 2 1 1 1		6

II(2)	Statement of Newton's second law of motion Rate of change in momentum= $(mv-mu)/t$ $(v-u)/t = a$ $F=ma$	2 2 1 1		6
II(3)	Definition of moment of a force about a point Condition for translational equilibrium Condition for rotational equilibrium	2 2 2		6
II(4)	$P=2\pi NC$ $N= 1$ revolutions per second $P= 1256W$	2 1 3		6
II(5)	$P=hdg = 1.96 \times 10^6 \text{ N/m}^2$ Volume strain= $\Delta v/v = 1 \times 10^{-3}$ $K=P/(\Delta v/v) = 1.96 \times 10^9 \text{ N/m}^2$	2 2 2		6
II(6)	Statement of Bernoulli's principle Equation from Bernoulli's principle Explanation of the working of spray atomizer	2 1 3		6
II(7)	Figure of uniform circular motion with projection Explanation $y = a \sin \omega t$ $dy/dt = a\omega \cos \omega t$ $d^2y/dt^2 = -\omega^2 y$	2 1 1/2 1/2 2		6
<b>Part C</b>				
III(a)	$v= u+gt$ $s= ut+1/2gt^2$ $v^2= u^2+ 2gs$	1 1 1	3	

III(b)	$S_n = S_1 - S_2$	1	6	15
	$S_1 = un + 1/2an^2$ and $S_2 = u(n-1) + 1/2a(n-1)^2$	2		
	Derivation	2		
	$S_n = u + a(n-1/2)$	1		
III(c)	$s = ut + 1/2at^2$ and $50 = 5u + 12.5a$	2	6	
	$S_n = u + a(n-1/2)$ and $14 = u + 4.5a$	2		
	Solving $u = 5\text{m/s}$ and $a = 2\text{m/s}^2$	2		

IV(a)	$I = F \times t$	1	3	
	$I = (mv - mu)/t \times t$	1		
	$I = mv - mu$	1		
IV(b)	Explanation of recoil of a gun using law of conservation of momentum	3	6	15
	$MV + mv = 0$	2		
	$V = -mv/M$	1		
IV(c)	$mgh = 1/2mv^2$	2	6	
	$v = \sqrt{2gh}$	2		
	$v = 1.4\text{m/s}$	2		
V(a)	Statement of Lami's theorem	1	3	
	Explanation with figure	1		
	$P/\sin\alpha = Q/\sin\beta = R/\sin\gamma$	1		

V(b)	Figure of Parallelogram with explanation Derivation of $R = \sqrt{P^2 + Q^2 + 2PQ\cos\theta}$ Derivation of $\alpha = \tan^{-1} [Q\sin\theta / (P + Q\cos\theta)]$	2 2 2	6	15
V(c)	$6.5 \times d = (1 \times 0.3 + 2 \times 0.45 + 0.5 \times 0.5 + 3 \times 0.86)$ $d = 0.62\text{m}$	3 3	6	
VI(a)	Definition of couple Any two characteristics of a couple	1 2	3	
VI(b)	Explanation with figure $W = F(AO + BO) \theta$ $W = C\theta$	2 2 2	6	15
VI(c)	$R = \sqrt{P^2 + Q^2 + 2PQ\cos\theta}$ Let $P = 3k$ & $Q = 5k$ solving we get $k = 5$ $P = 15\text{N}$ & $Q = 25\text{N}$	2 2 2	6	
VII(a)	Definition of elasticity Definition of plasticity	$1\frac{1}{2}$ $1\frac{1}{2}$	3	
VII(b)	Figure with the explanation of experiment procedure to find Young's modulus of a wire. $Y = \frac{MgL}{\pi r^2 l}$	4  2	6	15
VII(c)	$v = \frac{2r^2(\rho - d)g}{9\eta}$ Equating net volume in both cases we get $r_2 = 4r_1$ Terminal velocity of combined drop = $16\text{cm/s}$	2 2 2	6	

VIII(a)	Statement of equation of continuity Explanation $a_1 v_1 = a_2 v_2$	1 1 1	3	
VIII(b)	Explanation of the Poiseuille's method to determine the coefficient of viscosity with figure Poiseuille's formula $V = \frac{\pi Pr^4}{8l\eta}$ $\eta = \frac{\pi h d g r^4}{8lV}$	3 1 2	6	15
VIII(c)	$P_2 - P_1 = \frac{d}{2}(V_1^2 - V_2^2)$ $P_2 - P_1 = 1023.75 \text{ N/m}^2$ Upward lift = 307.25N	2 2 2	6	
IX(a)	Magnetostriction method for the production of ultrasonic waves	3	3	
IX(b)	3 diagrams of first three modes of vibration in an open pipe Derivation of $f = v/2L$ (For first mode of vibration) Derivation of $f_1 = v/L$ (For second mode of vibration) Derivation of $f_2 = 3v/2L$ (For third mode of vibration)	$1\frac{1}{2}$ $1\frac{1}{2}$ $1\frac{1}{2}$ $1\frac{1}{2}$	6	15
IX(c)	$v_t/v_0 = \sqrt{[(273+t)/273]}$ $v_t/v_0 = 2$ solving for t we get. $t = 819^\circ\text{C}$	2 1 3	6	
X(a)	Any three application of ultrasonic waves.	3	3	

X(b)	Explanation of resonance column experiment	2	6	15
	Obtaining relation $v=4f(l_1+e)$	2		
	velocity of sound in air by eliminating end correction, $v=2f(l_2-l_1)$	2		
X(c)	$2f=880\text{Hz}$ , $f=440\text{Hz}$	2	6	
	$\lambda = v/f = 350/440 = 0.795\text{m}$	2		
	$l = \lambda/2 = 0.795/2 = 0.398\text{m}$	2		

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