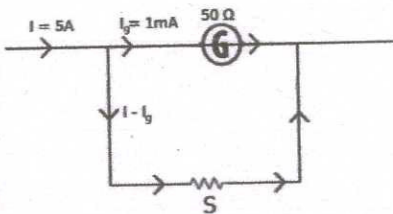
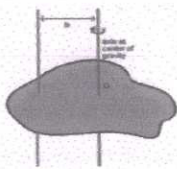
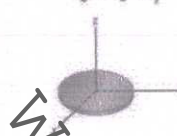
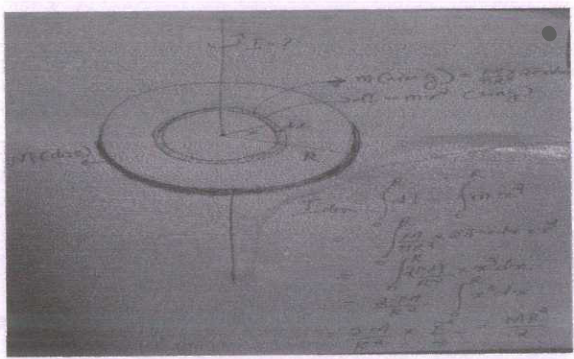


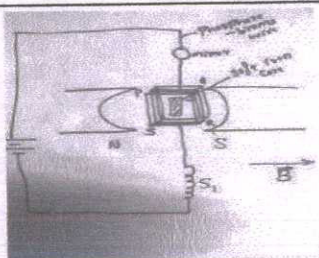
## SCHEME OF VALUATION

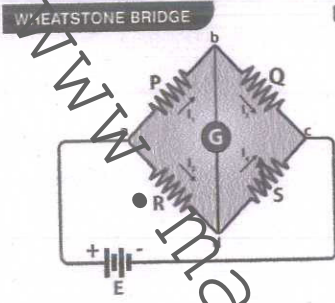
### Scoring indicator

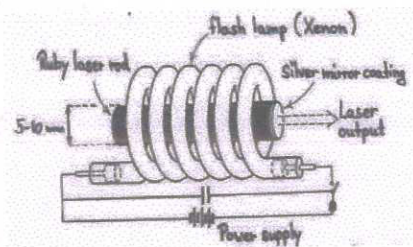
Revision: 2015		Course code: 2003		
Course title: Engineering Physics II				
Quest.No	Scoring Indicator	Split up score	Sub total	Total
<b>PART-A</b>				
I	definition	1		
1	equation $a=v^2/r$ , or $a=v\omega$ or $a=r\omega^2$	1	2	2
2	Statement equation $F=Gm_1m_2/r^2$ or $F\propto m_1m_2/r^2$	1 1	2	2
3	definition  equation, $I=mr^2$	1 1	2	2
4	statement equation $V\propto I$ or $V=IR$	1 1	2	2
5	any two applications	1+1	2	2
<b>PART-B</b>				
II				
1	Data- $m=5000\text{kg}$ , $r=1\text{km}=1\times 10^3\text{m}$ , $v=72\text{km/h}=72\times 5/18\text{m/s}=20\text{m/s}$ , conversion equation- $F=mv^2/r$ substitution result unit    answer $F=2000\text{N}$	1 1 1 1 1	6	6
2	torque any definition+equation ( $T=r\times F$ or $T=I\alpha$ ) angular momentum any definition+equation ( $L=r\times p$ or $L=I\omega$ ) Relation $T=dL/dt$	1+1 1+1 2	6	6
3	figure $R_p=R_1R_2/(R_1+R_2)=20\times 30/(20+30)=6/5\ \Omega$ $R_s=R_3+R_p=8+6/5=46/5=9.2\ \Omega$	2 1+1 1+1	6	6
4	 <p> <math>I=5\text{A}</math>, <math>I_G=1\text{mA}=1\times 10^{-3}\text{A}</math>, <math>G=50\ \Omega</math> (data)  <math>S=I_G\times G/(I-I_G)</math> (eqn)  <math>=1\times 10^{-3}\times 50/(5-1\times 10^{-3})</math> (Sub)  <math>=10^{-3}\times 50/4.999=10.002\times 10^{-3}\ \Omega</math> (Ans)  <math>10\text{m}\ \Omega</math> resistance is connected in parallel with the galvanometer                 </p>	1 1 1 1	6	6

5	Data in SI Units , $h=8.85 \times 10^3 \text{m}$ , $R=6400 \times 10^3 \text{m}$ $g=9.8 \text{m/s}^2$ $g_h = ?$ $g_h = g(1-2h/R)$ or $g_h = g/(1+h/R)^2$ or $g_h = GM/r^2$ eqn substitution calculation result in proper units ,Ans $g_h = 9.773 \text{m/s}^2$	1 1 1 2 1	6	6
6	data, $\lambda = 100 \times 10^{-9} \text{m}$ , $K_{\text{max}} = 10^{-18} \text{J}$ , $h = 6.63 \times 10^{-34} \text{SI units}$ , $c = 3 \times 10^8 \text{m/s}$ , $\phi = ?$ $E = K_{\text{max}} + \phi$ , $\phi = E - K_{\text{max}}$ , $E = hv = hc/\lambda = 1.989 \times 10^{-18} \text{J}$ , substitution+Calculation result in proper unit Ans $\phi = 0.989 \times 10^{-18} \text{J}$ ,	1 2 2 1	6	6
7	<b>Fuel</b> - eg-enriched $U^{235}$ (fissionable materials) <b>Moderator</b> -to slow down fast moving neutrons eg-heavy water ( $D_2O$ ), ordinary $H_2O$ , graphite, <b>Control rods</b> -to absorb excess neutrons so that the chain reaction to be controlled eg-boron cadmium rods, <b>coolant</b> -to remove heat energy from reactor to outside eg-heavy water, ordinary water, molten sodium <b>Safety rods</b> -for providing safety if reaction become uncontrolled due to disaster eg more boron cadmium rods <b>Shields or containment structure</b> -for protecting environment from radiations -eg separating from environment using thick concrete walls and steel (any four fullmark)	1 1 1 1 1 1	6	6
<b>Part C</b>				
UNIT-I				
III				
a	The process of giving slight inclination from inner to the outer edge of a curved road is called banking of curve ● $v^2/rg = \tan\theta$	2	3	15

b	<p>Parallel axis theorem -statement or equation with diagram,<math>I=I_0+Ma^2</math></p>  <p>figure</p> <p>Perpendicular axis theorem-statement or equation with diagram,<math>I_z=I_x+I_y</math></p>  <p>figure</p> <p>for disc <math>I_x=I_d, I_y=I_d</math> &amp; <math>I_z=MR^2/2</math>  <math>I_z=I_x+I_y, MR^2/2=I_d+I_d, MR^2/2=2I_d</math>  <math>I_d=MR^2/4</math></p>	2	6	
c	<p>data <math>M=10\text{kg}, R=10 \times 10^{-2}, v=5\text{m/s}, K_{\text{total}}=?</math>  <math>K_{\text{total}} = K_{\text{translation}} + K_{\text{rotation}} = (3/4)Mv^2</math> (eqn)  <math>K_{\text{total}} = Mv^2/2 + I\omega^2/2</math>  <math>I = MR^2/2</math> For disc          ie, <math>K_{\text{total}} = Mv^2/2 + MR^2\omega^2/4</math>          But <math>R\omega = v</math>  <math>K_{\text{total}} = Mv^2/2 + Mv^2/4 = (3/4)Mv^2</math>          Substitution +result (ans=187.5J)          give fullmark to data, any correct eqn, sub &amp; result</p>	1 2 3	6	
IV				
a	<p>Rate of change of angular displacement in circular motion- Angular velocity</p> $\omega = \frac{\theta}{t}$ <p>Derivation of <math>v=r\omega</math> with figure</p>	1 2	3	
b	<p>Concept of splitting of Disc as consecutive rings with figure</p>  <p>M.I of disc=Sum of M I of all rings          M I of ring= <math>m(\text{ring})x^2 = [(M/\pi R^2) \times 2\pi x dx]x^2</math>  <math display="block">M I \text{ of disc} = \int_0^R \frac{2Mx^3}{R^2} dx</math> ( Do it)  <math>I = MR^2/2</math> ( result)</p>	2 1 2 1	6	15

c	Data $\theta=?$ , $r=50\text{m}$ , $v=10\text{m/s}$ $\tan\theta=v^2/rg$ substitution+calculation result, $\theta=11.5^\circ$	1 2 2 1	6	
Unit II				
V				
a	explanation pointing $T=24$ hour & $h=36000\text{km}$ any 2 uses	1+1 1	3	15
b	it is the minimum velocity required to escape from the gravitational pull of earth given by $v_e = \sqrt{2Rg}$ Derivation Give 1 mark each for every step not exceed 4	1+1	6	
c	data $h=48 \times 10^3\text{m}$ $v_0=?$ & $T=?$ , $R=6400 \times 10^3\text{m}$ $g=9.8\text{m/s}^2$ $v_0 = \sqrt{GM/r}$ , $T^2 = (4\pi^2/GM)xr^3$ substitution Result $v_0=7.493 \times 10^3\text{m/s}$ , $T=5990.23\text{s}=99\text{min}=1.66\text{h}$	1 2 2 1	6	
VI				
a	$g_h = g(1-2h/R)$ , $g_d = g(1-d/R)$ , $g_\theta = g - R\omega^2 \cos^2\theta$	1+1+1		15
b	derivation of orbital velocity, $v_0 = \sqrt{GM/r}$ $F_{\text{centripetal}} = F_{\text{gravitation}}$ $Mv^2/r = GmM/r^2$ derivation of period $T^2 = (4\pi^2/GM)xr^3$ Figure+Equation+substitution+result	2 1+1+1+1	6	
c	$g=?$ , $R=1750 \times 10^3\text{m}$ , $M=7.44 \times 10^{22}\text{kg}$ , $G=6.67 \times 10^{-11}$ SI unit (Data+conversion) eqn $g = GM/R^2$ substitution + calculation answer with with correct unit $g=1.62\text{m/s}^2$	1+1 1 2 1	6	
Unit III				
VII				
a	Statement of Fleming's left hand rule $F = I \times B$ or $F = I \times B$ or $F = I \times B$	2 1	3	15
b	 Schematic diagram Principle $\tau = NIAB$ or $F = I \times B$ Working $\tau_{\text{electrical}} = NIAB$ , $\tau_{\text{restoring}} = C\theta$ At equilibrium, $\tau_{\text{electrical}} = \tau_{\text{restoring}}$ $NIAB = C\theta$ , $I = (C/NAB) \times \theta$	2 1 1 1 1	6	

c	$\rho = 1.7 \times 10^{-8} \Omega \text{m}$ , $l = ?$ , $r = 1 \text{mm} = 1 \times 10^{-3} \text{m}$ , $R = 1 \Omega$ $\rho = RA/l$ , $l = RA/\rho$ , $A = \pi r^2$ $l = R\pi r^2 / \rho$ , substitution+calculation+result ans $l = 184.7 \text{m}$	1 2 3	6	
VIII				
a	Magnetic field due to a current carrying element at a distance $r$ is proportional to current, $dl$ , $\sin\theta$ and $1/r^2$ $dB = \mu_0 i dl \frac{\sin\theta}{r^2}$	1 ½  1 ½	3	15
b	statement of kirchhoffs laws $\Sigma I = 0$ , $\Sigma V_i = 0$ or $\Sigma IR = \Sigma E$ Wheatstone's bridge picture  $I_1 = I_3$ and $I_2 = I_4$ $I_1 P = I_2 R$ and $I_3 Q = I_4 S$ $I_1 / I_2 = P/R$ and $I_3 / I_4 = S/Q = I_1 / I_2$ so Wheatstone's principle $\frac{P}{R} = \frac{Q}{S}$ , when $I_G = 0$	1+1  2	6	
c	$B = ?$ , $r = 10 \text{m}$ , $I = 10 \text{A}$ Eqn $B = \mu_0 I / 2\pi r$ Substitution+calculation Result in proper Unit, $B = 2 \times 10^{-7} \text{T}$	1 2 2 1	6	
IX				
a	monochromatic, coherent, Highly intense, high directional (any 3)	3	3	15
b	statement of laws Photo electric effect is frequency dependent( Explain) Photo electric effect is instantaneous (explain) Photocurrent affected by intensity of the coming light(explain) derivation of the eqn $K_{\text{max}} = h(\nu - \nu_0)$	3	6	
c	$\nu_0 = ?$ , $\Phi = 2.8 \text{eV} = 2.8 \times 1.6 \times 10^{-19} \text{J}$ , $h = 6.63 \times 10^{-34} \text{Js}$ $\Phi = h\nu_0$ , $\nu_0 = \Phi/h$ substitution+result ans $\nu_0 = 6.757 \times 10^{14} \text{Hz}$	2  2 1+1	6	
X				

a	fission Fusion	1(½) 1(½)	3	15
b	population inversion+optical pumping  fig Working Ruby rod consist of Al <sub>2</sub> O <sub>3</sub> With some Chromium flash lamp excite Cr and attain population inversion. Then it comes back by spontaneous emission. Spontaneously emitted photon stimulate further emission and lasing action and produce red light	1+1 2 2	6	
c	$m_H = 2.0147 \text{ u}$ , $m_{He} = 4.0026 \text{ u}$ , $E = ?$ $E = \Delta mc^2 = (\Delta m) \times 931 \text{ MeV}$ $= (2 \times 2.0147 - 4.0026) \times 931 = 24.95 \text{ MeV}$	1 2 3	6	