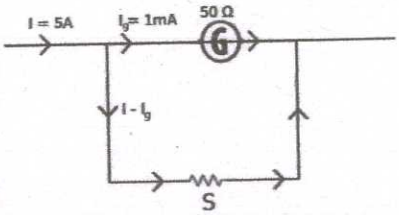
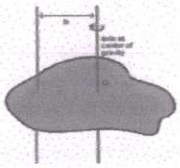
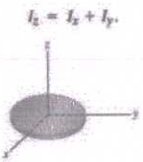
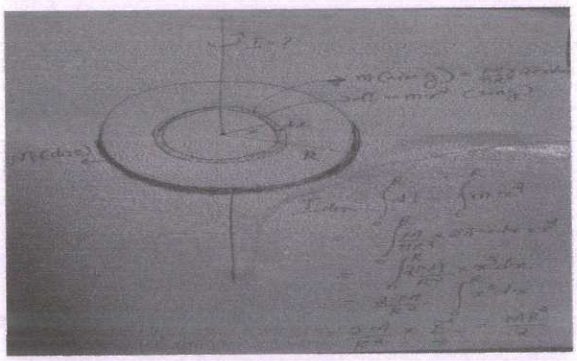
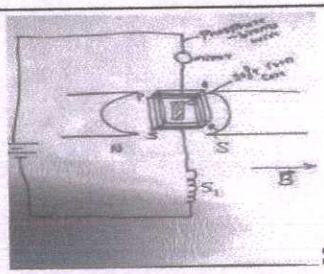
SCHEME OF VALUATION
Scoring indicator

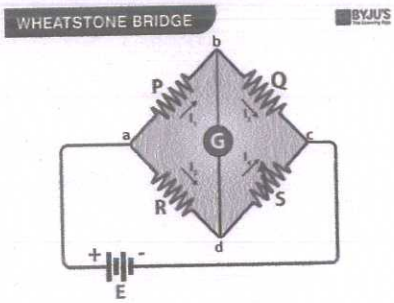
Revision: 2015 Course code: 2003
Course title: Engineering Physics II

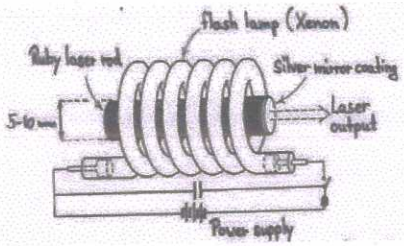
Quest.No	Scoring Indicator	Split up score	Sub total	Total
	PART-A			
I 1	definition equation $a=v^2/r$,or $a=vw$ or $a=rw^2$	1 1	2	2
2	Statement equation $F=Gm_1m_2/r^2$ or $F\propto m_1m_2/r^2$	1 1	2	2
3	definition equation,$I=mr^2$	1 1	2	2
4	statement equation $V\propto I$ or $V=IR$	1 1	2	2
5	any two applications	1+1	2	2
	PART-B			
II				
1	Data-m=5000kg,r=1km=$1x10^3$m, v=72km/h=72x5/18m/s=20m/s, conversion equation-$F= mv^2/r$ substitution result unit answer F=2000N	1 1 1 1 1 1	6	6
2	torque any definition+equation ($T=rxF$ or $T=I\alpha$) angular momentum any definition+equation ($L=rxp$ or $L=I\omega$) Relation $T=dL/dt$	1+1 1+1 2	6	6
3	figure $R_p=R_1R_2/(R_1+R_2)=20X30/(20+30)=6/5\,\Omega$ $R_S= R_3+R_P=8+6/5=46/5=9.2\ \Omega$	2 1+1 1+1	6	6
4	 I=5A ,I_G=1mA=$1x10^{-3}$A,G=50Ω (data) $S=I_GxG/(I-I_G)$ (eqn) $=1x10^{-3}x50/(5-1x10^{-3})$ (Sub) $=10^{-3}x50/4.999=10.002x10^{-3}\Omega$ (Ans) 10mΩ resistance is connected in parallel with the galvanometer	2 1 1 1 1	6	6

5	Data in SI Units ,$h=8.85\times10^3$m,$R=6400\times10^3$m $g=9.8m/s^2$ 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 $g_h=9.773m/s^2$	1 1 1 2 1	6	6
6	data,$\lambda=100\times10^{-9}$m, $K_{max}=10^{-18}$J, $h=6.63\times10^{-34}$ SIunits, $c=3\times10^8$m/s, φ=? $E=K_{max}+\varphi$, $\varphi=E-K_{max}$, $E=h\nu=hc/\lambda=1.989\times10^{-18}$J, substitution+Calculation result in proper unit Ans $\varphi=0.989\times10^{-18}$J,	1 2 2 1	6	6
7	**Fuel**- eg-enriched U^{235} (fissionable materials) **Moderator**-to slow down fast moving neutrons eg-heavy water (D2O), ordinary H2O, graphite, **Control rods**-to absorb excess neutrons so that the chain reaction to be controlled eg-boron cadmium rods,**coolant**-to remove heat energy from reactor to out side eg-heavy water,ordinary water,molten sodium **Safety rods**-for providing safety if reaction become uncntrolled due to disaster eg more boron cadmium rods **Shields or containment structure** -for protecting environment from radiations -eg separating from environment using thick concrete walls and steel (any four fullmark)	1 1 1 1 1	6	6
	Part C			
	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 1	3	15

b	Parallel axis theorem -statement or equation with diagram, $I=I_0+Ma^2$  figure Perpendicular axis theorem-statement or equation with diagram, $I_z=I_x+I_y$  figure for disc $I_x=I_d$, $I_y=I_d$ & $I_z=MR^2/2$ $I_z=I_x+I_y$, $MR^2/2=I_d+I_d$, $MR^2/2=2I_d$ $I_d=MR^2/4$	2 2 2	6	
c	data M=10kg, R=10×10^{-2}, v=5m/s, K_{total}=? $K_{total}=K_{translation}+K_{rotation}=(3/4)Mv^2$ (eqn) $K_{total}=Mv^2/2+I\omega^2/2$ $I=MR^2/2$ For disc ie, $K_{total}=Mv^2/2+MR^2\omega^2/4$ But $R\omega=v$ $K_{total}=Mv^2/2+Mv^2/4=(3/4)Mv^2$ Substitution +result (ans=187.5J) give fullmark to data, any correct eqn, sub & result	1 2 3	6	
IV				
a	Rate of change of angular displacement in circular motion- Angular velocity $\omega=\frac{\theta}{t}$ Derivation of $v=r\omega$ with figure	1 2	3	15
b	Concept of splitting of Disc as consecutive rings with figure  M.I of disc=Sum of M I of all rings M I of ring= $m(ring)x^2=[(M/\pi R^2)\times2\pi x dx]x^2$ M I of disc= $\frac{\int_0^R 2Mx^3}{R^2}dx$ (Do it) $I=MR^2/2$ (result)	2 1 2 1	6	

c	Data θ=?,r=50m,v=10m/s $\tan\theta=v^2/rg$ substitution+calculation result, $\theta=11.5^0$	1 2 2 1	6	
	Unit II			
V				
a	explanation pointing T=24 hour & h=36000km 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 $h=748\times10^3$m v_0=? &T=?,$R=6400\times10^3$m $g=9.8m/s^2$ $v_0=\sqrt{(GM/r)}, T^2=(4\pi^2/GM)xr^3$ substitution Result $v_0=7.493\times10^3$m/s, T=5990.23s=99min=1.66h	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 ,$v_0=\sqrt{(GM/r)}$ $F_{centripetal}=F_{gravitation}$ $Mv^2/r=GmM/r^2$ derivation of period $T^2=(4\pi^2/GM)xr^3$ Figure+Equation+substitution+result	2 1+1+1+1	6	
c	g=?, $R=1750\times10^3$m,$M=7.44\times10^{22}$kg, $G=6.67\times10^{-11}$ SIunit (Data+conversion) eqn $g=GM/R^2$ substitution + calculation answer with with correct unit $g=1.62m/s^2$	1+1 1 2 1	6	
	Unit III			
VII				
a	Statement of Fleming's left hand rule F=IlB or F=IlxB orF=IdlB	2 1	3	15
b	 Schematic diagram Principle τ= NIAB or F=Ilb Working $\tau_{electrical}$= NIAB,$\tau_{restoring}$=Cθ At equilibrium,$\tau_{electrical}$= $\tau_{restoring}$ NIAB=Cθ,I=(C/NAB)xθ	2 1 1 1 1	6	

c	$\rho=1.7\times10^{-8}\Omega m, l=?, r=1mm=1\times10^{-3}m, R=1\Omega$ $\rho=RA/l, l=RA/\rho, \quad A=\pi r^2$ $l=R\pi r^2/\rho$, substitution+calculation+result ans l=184.7m	1 2 3	6	
VIII				
a	Magnetic field due to a current carrying element at a distance r is proportional to current, dl, sinθ and $1/r^2$ $dB = \mu_0 i dl \frac{\sin\theta}{4\pi r^2}$	1 ½ 1 ½	3	15
b	statement of kirchhoffs laws ΣI=0, ΣVi=0 or ΣIR= ΣE Wheatstone's bridge picture  fig $I_1=I_3$ and $I_2=I_4$ $I_1P=I_2R$ and $I_3Q=I_4S$ $I_1/I_2=P/R$ 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 2	6	
c	B=?, r=10m, I=10A Eqn $B=\mu_0 I/2\pi r$ Substitution+calculation Result in proper Unit, $B=2\times10^{-7}T$	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 $K_{max}=h(\nu-\nu_0)$	3 3	6	
c	$\nu_0=?$, $\Phi=2.8eV=2.8\times1.6\times10^{-19}J, h=6.63\times10-34Js$ $\Phi=h\nu_0, \nu_0=\Phi/h$ substitution+result ans $\nu_0=6.757\times10^{14}Hz$	2 2 1+1	6	
X				

a	fission Fusion	1(½) 1(½)	3	
b	population inversion+optical pumping  fig Working Ruby rod consist of Al_2O_3 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	15
c	mH=2.0147u ,mHe=4.0026u ,E=? E=Δmc2=(Δm)in x931MeV =(2x2.0147-4.0026)931=24.95MeV	1 2 3	6	