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
I 1	The outer portion of the curved part of the road rises slightly above the inner for the safe turn without depending on the frictional force - banking of the road. Here a component of normal force will contribute to the centripetal force	2	2	2
2	escape velocity- The minimum velocity required to escape from the gravitational field of any planet $V_e=\sqrt{2gR}$ or $\sqrt{\frac{2GM}{R}}$	1 1	2	2
3	Ohm's law- At constant temperature the current flowing through the conductor is proportional to the potential difference between the ends V=IR	1 1	2	2
4	Atoms comes from excited state to ground state without any external causation by emitting a photon –Spontaneous emission an external photon strike an excited atom and induce the atom to return to the ground state by emitting an identical photon-Stimulated emission	1 1	2	2
5	Materials used to absorb neutrons and control chain reaction Each example (eg; cadmium, boron)	1 1/2	2	2
II				
1	Write the given datas Centripetal force= mv^2/r For first particle $F1=mV^2/2R$ For second particle $F2=m(2V)^2/3R$ F1/F2= Ratio=3/8	1 1 1 1 1 1	6	6

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2	Write the given datas Total kinetic energy= (Translational K.E+ Rotational K.E) $\text{K E} = \frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$ Apply data Total energy=3.195 J	1 1 2 1 1	6	6
3	Write the given datas $g_h = g_0/(1+\frac{h}{R})^2$ $\left(\sqrt{\frac{g_0}{g_h}} - 1\right)R = h$ Apply the data H=66 km	1 2 1 1 1	6	6
4	Write the given datas $R_1 + R_2 = 10\Omega$ $\frac{R_1R_2}{R_1+R_2} = 2.4\Omega$ Solving the equation $R_2 = 4\ \ R_1 = 6$	1 1 1 2 1	6	6
5	Write the given datas $\frac{hc}{\lambda} - \frac{hc}{\lambda_0} = \frac{1}{2}mv^2$ $\sqrt{\frac{2hc}{m}\left[\frac{1}{\lambda} - \frac{1}{\lambda_0}\right]} = v$ Solving the equation V=1.87×10^6 m/s	1 1 1 2 1	6	6
6	Write the given datas $E = I_g(G+R)$ Solve the equation by applying values E=5v	1 2 2 1	6	6

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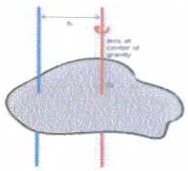
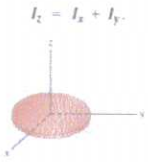
7	Write the given datas $g = \frac{GM}{R^2}$ $M = \frac{gR^2}{G}$ Apply the given data M=7.44×10^{22} kg	1 1 1 2 1	6	6
III				
a	The distance from an axis at which the mass of a body assumed to be concentrated and at which the moment of inertia will be equal to the moment of inertia of the actual mass about the axis Or equal to the square root of the ratio of the moment of inertia and the mass.(Or any definition) $K = \sqrt{\frac{I}{M}}$	2 1	3	15
b	Parallel axis theorem -the moment of inertia of a body about any axes is same as the moment of inertia I_G about an axis parallel to the body and passing through its center of gravity plus Mb^2, where M is the mass of that body and d is the distance between the axis and the center of gravity  Perpendicular axis theorem- the moment of inertia about an axis which is perpendicular to its plane is equal to the sum of its moments of inertia about two perpendicular axes in its plane. 	2 1 2 1	6	

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c	Write the given datas $\frac{mv^2}{r} = 25N$ Solving the equation $v = 5m/s$	1 2 2 1	6	
IV				
a	Rate of change of angular displacement in circular motion- Angular velocity $\omega = \frac{\theta}{t}$ $v = \frac{s}{t}$ $\theta = \frac{s}{r}$ So $\omega = \frac{v}{r}$	1 ½ ½ ½ ½	3	15
b	Concept of splitting of Disc as consecutive rings M.I of disc=Sum of M I of all rings M I of ring= m(ring)x^2=[(M/πR^2)×2πxdx]x^2 M I of disc= $\frac{\int_o^R 2Mx^3}{R^2} dx$(Do it) I=M$R^2$/2	1 1 1 2 1	6	
c	Write the datas I=MR^2 (5×0.1^2)2 +(2×0.2^2)2 =0.26	1 2 2 1	6	
V				
a	Every body in the universe attract each other with a force which is directly proportional to the to the product of their masses and inversely proportional to the square of the distance between them " $F = \frac{Gm_1m_2}{R^2}$	2 1	3	15

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b	$g = \frac{GM}{R^2}$ At a height h $g_h = \frac{GM}{(R+h)^2}$ Solve the equation $g_h = \frac{g}{(1+h/R)^2}$	1 2 2 1	6	
c	Write the datas $F = \frac{Gm_1m_2}{R^2}$ Substitute the values F=0.167 N	1 2 1 2	6	
VI				
a	Gravitational potential- The work done to bring a unit mass from infinity to a point in the gravitational field of another mass	3		15
b	$\frac{mv^2}{R+h} = \frac{GMm}{(R+h)^2}$ $v = \sqrt{\frac{GM}{R+h}}$ $GM = gR^2$ $v = \sqrt{\frac{gR^2}{R+h}}$	2 2 1 1	6	
C	Write the datas given $v = \sqrt{\frac{gR^2}{R+h}}$ Substitute the values V=7.74 km/s	1 2 2 1	6	

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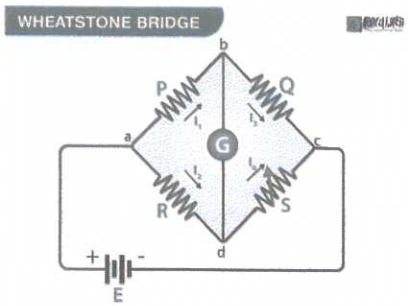
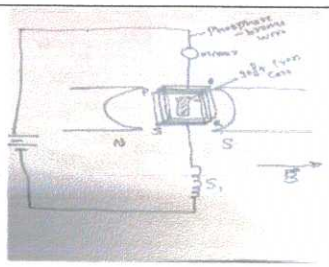
VII				
a	Statement of first law- Total current at any junction/point equals zero $\sum I=0$ Second law-Total voltage in any current loop is equal to zero $\sum V=0$	1 ½ 1 ½	3	15
b	Wheatstone's bridge picture  $I_1=I_3$ and $I_2= I_4$ $I_1P= I_2R$ and $I_3Q= I_4S$ $I_1/ I_2=P/R$ and $I_3/ I_4=S/Q= I_1/ I_2$ so Wheatstone's principle $\frac{P}{R}=\frac{Q}{S}$	2 1 1 1 1	6	
c	 F=nBil and couple C=F×b= nBi(lb) C=nBiA= $\alpha\theta$ α = *couple per unit twist* $i=\frac{\alpha\theta}{nBA}$	2 2 1 1	6	

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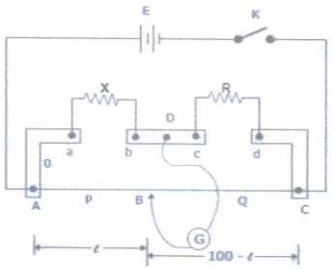
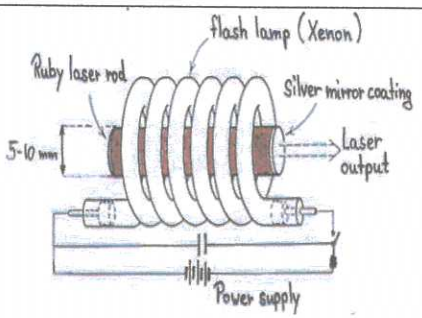
VIII				
a	Magnetic field due to a current carrying element at a distance r is proportional to current, dl, sinθ and $1/r^2$ $$dB = \mu_0 idl\frac{\sin\theta}{4\pi r^2}$$	1 ½ 1 ½	3	15
b	 Description of experimental set-up $$\frac{X}{R} = \frac{lr}{(100-l)r}$$ $$X = \frac{Rl}{100-l}$$	2 1 2 1	6	
c	Write the given datas $$R = \frac{\rho l}{A}$$ $$l = \frac{RA}{\rho}$$ Substitute the values Length=0.64 m	1 1 1 2 1	6	
IX				
a	 Ruby rod consist of Al_2O_3 With some Chromium Using flash lamp excite Cr and attain population	2 1 1	6	

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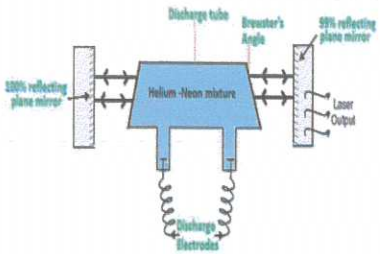
	inversion. Then it comes back by spontaneous emission. Spontaneously emitted photon stimulate further emission and lasing action and produce red light	 1 1		15
b	Production of electricity Research process(Radioactive by-products and neutrons) Production of fissile material-Breeder reactor In nuclear submarines (For each use)	 1	3	
c	$E = h\nu = h\nu_0 + kinetic\ energy$ 1. Photo electric effect is frequency dependent(Explain) 2. Photo electric effect is instantaneous (explain) 3. Photocurrent affected by intensity of the coming light(explain)	1 ½ 1 ½ 1 ½ 1 ½		
X				
a	 Optical pumping obtained by an electric field He excites and it excites Ne. Neon come back to ground by emitting photon Produce red light	2 1 1 1 1	6	15
b	In burglar's alarm In relay circuit In television cameras Fire alarms (Any three applications-)	 3	3	

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c	Fuel, Moderator, Control rods ,coolant ,containment structure(1/2 mark for each)	4×1/2 =2		
	Discussion of nuclear fusion in Sun , proton-proton cycle. four hydrogen nuclei (protons) are combined to form one helium nucleus;	3		
	$4\ {}_1H^1 = {}_2He^4 + 2e^+ + energy$	1		