	Reg. No.:	
	Name :	

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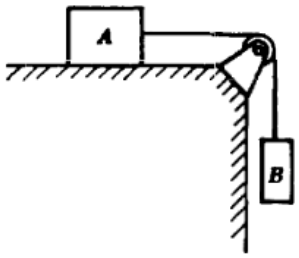
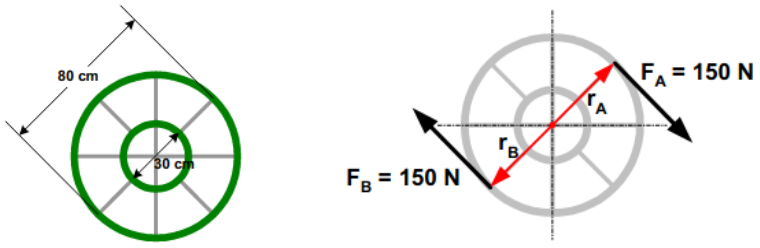
Mid-Term Examinations – August 2021

Programme	:	**B.Tech. [BCE]**	Semester	:	**Fall 2021-22**
Course	:	**Engineering Physics**	Code	:	**PHY1001**
Faculty	:	**Dr. Suchetana Sadhukhan**	Slot/ Class No.	:	**A11+A12+A13/ 0036**
Time	:	**1 ½ hours**	Max. Marks	:	**50**

Answer all the Questions

Q.No.	Sub. Sec.	Question Description	Marks
1		A block A has a mass of 8 kg and is at rest on a frictionless horizontal surface. A 4-kg mass B is attached to a rope as shown in figure. Determine the acceleration of the mass B and the tension in the cord. The pulley is frictionless. 	**10**
2		Assume a large hand wheel as shown in the figure. The man, who operates it, exerts a force of 150 N on each side of a large wheel (80cm diameter) thus produces a force couple, as shown the second figure. Calculate the moment of the force couple. 	**10**
3		Replace the following classical mechanical expressions with their corresponding quantum mechanical operators. a. K.E. = $1/2*mv^2$ b. p = mv c. total energy E=K.E+P.E	**10**

4		Consider an infinite square well with wall boundaries x=0 and x=L. Show the energy eigenvalues, wavefunction and its probability density distribution for the first five excited states of an electron.	**10**
5		Explain why the surface area to volume ratio is important in nanophysics and calculate this ratio for a sphere of diameter 30 μm.	**10**
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