

		Reg. No.:	
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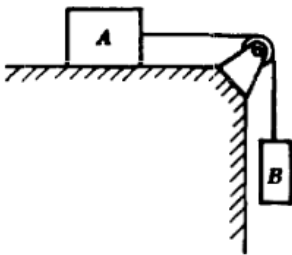
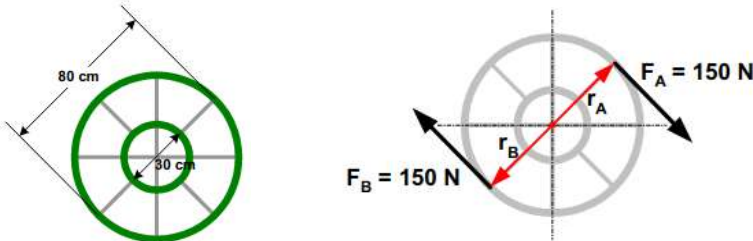


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Mid-Term Examinations – August 2021

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		<p>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.</p> 	10
2		<p>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.</p> 	10
3		<p>Replace the following classical mechanical expressions with their corresponding quantum mechanical operators.</p> <p>a. $K.E. = 1/2*mv^2$ b. $p = mv$ c. total energy $E=K.E+P.E$</p>	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 $30\text{ }\mu\text{m}$.	10
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