ASSIGNMENT-1
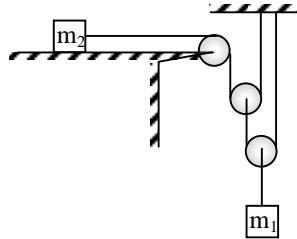
NUMERICAL QUESTIONS:

**Q.1** Pulleys are ideal and string are massless. The masses of blocks are m_1 = 4 kg and m_2 = 1 kg as shown. If all surfaces are smooth then the acceleration of m_2 in m/s^2 is (g = 10 m/s^2)


Q.2 A block of mass 5 kg is placed on bus moving with acceleration 2m/s^2. Pseudo force acting on block as seen by a man on ground is -

Q.3 Three blocks A, B and C of mass m each are arranged in pulley mass system as shown. Coefficient of friction between block A and horizontal surface is equal to 0.5 and a force P acts on 'A' in the direction shown. The value of P/mg so that block 'C' doesn't move is –
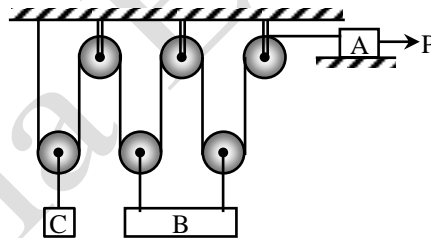

Q.4 Two blocks 1 and 2 of mass 2kg and 4 kg are kept connected as shown in figure. All pulley and string are massless and surfaces are frictionless. Acceleration of block 1 at the instant shown is -
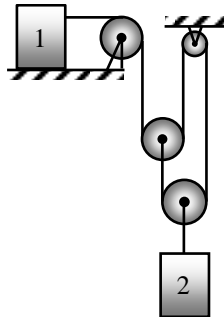
Q.5 A block of mass 0.2kg is kept on wedge of mass 0.6 kg which is kept on rough table. Block is slipping down with constant speed 2m/s. Normal force on wedge due to table is (Assume wedge is stationary) -
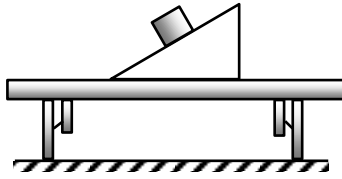

Q.6 In the given arrangement, strings and pulleys are light and all surface are frictionless. Assuming at t = 0, system is released from rest, find the speed of block A (in decameter/sec) at t = 2 sec.
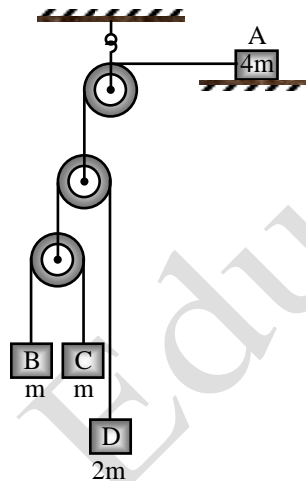

Q.7 In the system shown in figure all surfaces are frictionless while pulley and strings are light. Mass of block A is 2m while that of B is 'm'. Acceleration of block 'B' (in cm/s^2) immediately after system is released from rest minus 320 cm/s^2 is (Take g = 981 cm/s^2).
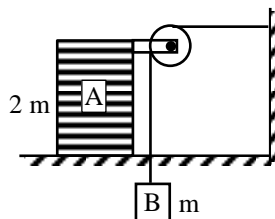
Q.8 In the arrangement shown in figure end 'A' of light inextensible string is pulled with constant velocity v = 6 m/s. The velocity of block 'B' is (in m/s) -
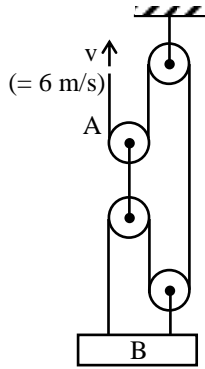
Q.9 Figure shows a string passing through two fixed pulley P$_1$ and P$_3$ and a pulley P$_2$ free to move vertically. One end of string is attached with ring A. Velocity of pulley P$_2$ at the instant shown is (in m/s) -
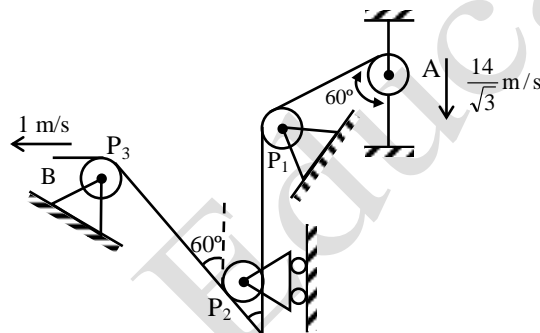
Q.10 A block of mass 1 kg is just fit in a groove in a platform kept horizontally. Groove is along + ve x-axis. The platform is given acceleration $\vec{a} = 2\hat{i} + 3\hat{j}$ m/s^2. If block is not slipping on platform the friction force acting on block (in Newton)

Q.11 A block of mass 2 kg is placed on rough horizontal surface (coefficient of friction = 0.2) and is pulled by horizontal force F = 2t N where t : time in sec. Velocity of block at t = 4 sec is –

Q.12 A system consisting of man on platform is in equilibrium. Mass of man and platform are equal. If tension in left string is T$_1$ and that in right string in T$_2$, then 5T$_1$/T$_2$ is -