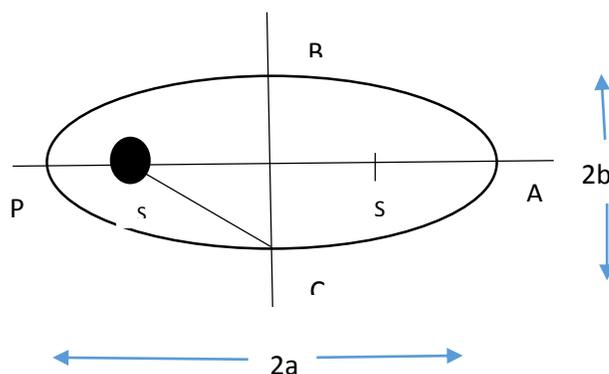# GRAVITATION

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General Instructions: Answer all the questions. If you are unable to answer any question, go through the page number that is given against that particular question in the text book. You can find the answer.

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Test Paper-I

MAX MARKS: 30   TIME: 90Mts

1   Who proposed the heliocentric model of planetary system? What was the proposition?   P183   2

2   What are the achievements of Kepler towards Planetary system?   P184   2

3   State Kepler's laws of planetary motion   P184   3

4   Let the speed of the planet at the perihelion P in figure be vp and the Sun-planet distance SP be r_p . Relate $\{r_p, vp\}$ to the corresponding quantities at the aphelion $\{r_A, vA\}$. Will the planet take equal times to traverse BAC and CPB?   P185   2

An ellipse traced out by a planet around the sun. The closest point is P and the farthest point is A, P is called the perihelion and A the aphelion. The semimajor axis is half the distance AP.

5   State Universal Law of Gravitation. Also give the vector form of the force acting between any two bodies.   P187   2

6   What is a central force? What important conclusions can be drawn when the motion of a particle is under the central force?   P186   2

7   Three equal masses of m kg each are fixed at the vertices of an equilateral triangle ABC.   P188   3

    a.   What is the force acting on a mass 2m placed at the centroid G of the triangle?

    b.   What is the force if the mass at the vertex A is doubled?

    Take AG=BG=CG=1m in the figure.
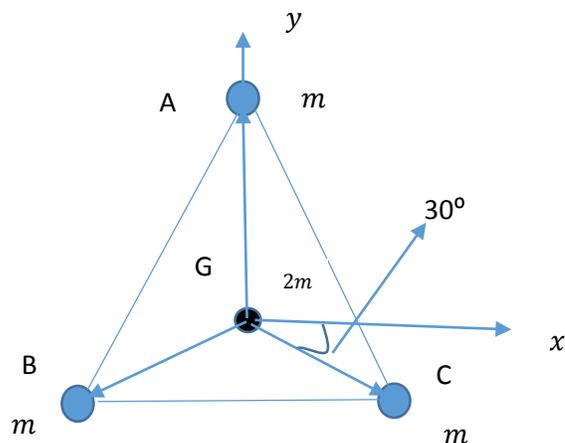
Three equal masses are placed at the three vertices of the triangle ABC.
A mass 2m is placed at the centroid G.

8   What is the force of attraction due to a hollow spherical shell of uniform density on a

     point mass   P188   2

        a.   When it is situated outside the shell and

        b.   When it is situated inside the shell.

9   Define acceleration due to gravity. Derive an expression to find the same.   P189   3

10   Derive an expression to find the value of acceleration due to gravity at a point below   P190   3

     and above the surface of the earth.

11   What is meant by gravitational potential energy? Derive an expression for the same.   P191   3

12   Is gravitational potential energy conservative or non-conservative force? Give reason   P191   2

     for the same.

13   What is the value of acceleration due to gravity at the Centre of the earth?   1