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-II

MAX MARKS: 30   **TIME: 90Mts**

1	Define escape velocity of a body. Derive an expression to find the same.	P193	3
2	What is meant by a satellite? Name the natural satellite of the earth. How will you find out the speed of the satellite?	P194	3
3	Define time period of a satellite. Also derive an expression to find the time period of the satellite. Also find the time period of a satellite very close to the surface of the earth.	P194	3
4	The planet Mars has two moons, phobos and delmos. (i) phobos has a period7 hrs, 39 minutes and an orbital radius of 9.4 X 10 ^{3}Km. Calculate the mass of the Mars. (ii) Assume that earth and mars move in circular orbits around the sun, with the Martian orbit being 1.52 times the orbital radius of the earth. What is the length of the Martian year in days?	P195	3
5	Given the following data: g= 9.81ms$^{-2,}$ R$_E$= 6.37 X 10^{6}m, the distance to the moon R = 3.84 X 10^{8}m and the time period of the moon's revolution is 27.3 days. Obtain the mass of the Earth M$_E$ in two different ways.	P195	3
6	What is the expression to find the energy of an orbiting satellite? What is the physical significance of negative sign in the expression for energy of the satellite? What happens to the satellite if the value of energy is positive or zero.	P196	3
7	A 400 kg satellite is in a circular orbit of radius 2R$_E$ about the Earth? How much energy is required to transfer it to a circular orbit of radius 4 R$_E$? What are the changes in the kinetic and potential energies?	P196	3
8	Give the differences between Geostationary and Polar satellites.	P197	3

| 9 | Define weight of an object. What is the principle involved in the measurement of weight of an object using a spring balance? What is the reading recorded by a spring balance of a body, when the spring balance is falling? | P197 | 3 |
| 10 | What is meant by weightlessness of a body? Explain why an astronaut floats inside a satellite? | P197 | 3 |