

## Worksheet: Gravitation

Uttar Pradesh State Board · Class 11 · Physics · 10 questions · 31 marks

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 31

**Q1.** Two masses of 10 kg and 20 kg are placed 1.0 m apart. Find the gravitational force between them. *[2 marks]*

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**Q2.** Find  $g$  at a height equal to  $R$  above Earth's surface. *[2 marks]*

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**Q3.** Why is  $g$  zero at the centre of the Earth? *[2 marks]*

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**Q4.** At what depth below the Earth's surface does  $g$  fall to half its surface value? Take  $R = 6400$  km. *[3 marks]*

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**Q5.** Find the orbital velocity of a satellite at 300 km height ( $R = 6400$  km,  $M = 6 \times 10^{24}$  kg). *[3 marks]*

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**Q6.** Calculate the escape velocity on the Moon ( $g = 1.62 \text{ m/s}^2$ ,  $R = 1740$  km). *[3 marks]*

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**Q7.** If Earth's period is 1 year at orbital radius  $R$ , find the period of a planet at radius  $4R$ . *[3 marks]*

**Q8.** Find the gravitational potential energy of a 100 kg satellite at a height of 3600 km above the Earth's surface ( $R = 6400$  km,  $M = 6 \times 10^{24}$  kg). *[3 marks]*

**Q9.** A 200 kg satellite orbits at a height of 400 km ( $R = 6400$  km,  $M = 6 \times 10^{24}$  kg). Find its total energy, and the extra energy needed to make it escape. *[5 marks]*

**Q10.** A body is projected vertically from the Earth's surface with a speed equal to half the escape speed. Find the maximum height it reaches, in terms of the Earth's radius  $R$ . *[5 marks]*