Quiz D17.1

Gravitation

1. The gravitational field strength on the surface of Earth is g. A planet has half the mass and half the radius of Earth. What is the gravitational field strength on the surface of the planet?

A $\dfrac{g}{8}$ 　　　　 B $\dfrac{g}{4}$ 　　　　 C $\dfrac{g}{2}$ 　　　　 D $2g$

2. A satellite is in a circular orbit around the Earth. Its orbital speed is v. A second satellite of double the mass is in the same orbit. What is the orbital speed of the heavier satellite?

A $\dfrac{v}{4}$ 　　　　 B $\dfrac{v}{2}$ 　　　　 C v 　　　　 D $2v$

3. A satellite is in a circular orbit of radius R around the Earth. Its orbital speed is v and the gravitational force it experiences is F. An identical satellite is in a circular orbit radius $2R$ around a planet of mass double that of Earth. What is the orbital speed of the satellite and the gravitational force it experiences?
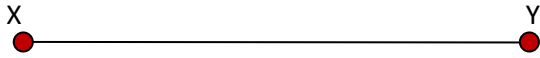
	Orbital speed	Force
A	v	F
B	v	$\dfrac{F}{2}$
C	$\dfrac{v}{2}$	F
D	$\dfrac{v}{2}$	$\dfrac{F}{2}$

4. In which of regions I, II and III , could the gravitational field strength be directed to the left?

I   II   III
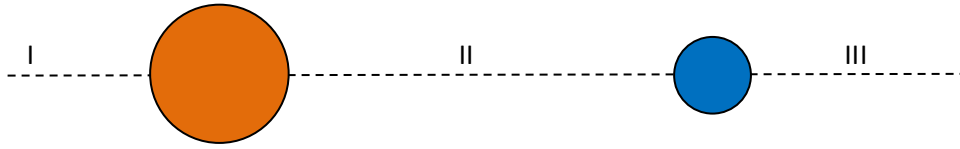
A   I and II

B   I and III

C   II and III

D   I, II and III

5. The gravitational force between two equal point masses X and Y is F.

X   Y
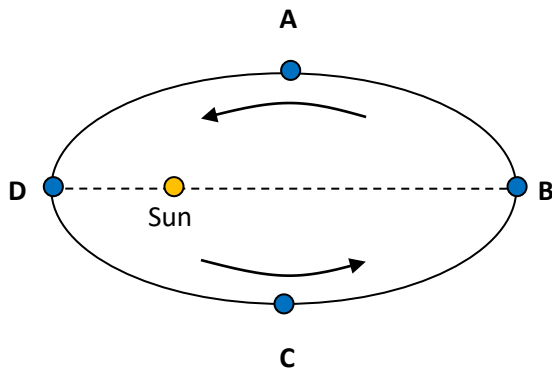
The mass of X is doubled and the separation is halved. What is the force on X and what is the force on Y?

	Force on X	Force on Y
A	$4F$	$4F$
B	$4F$	$8F$
C	$8F$	$4F$
D	$8F$	$8F$

6. A satellite in a circular orbit of radius R has period T. What is the orbital radius of a satellite in a circular orbit of period $8T$?

A $2R$ **B** $4R$ **C** $8R$ **D** $16R$

7. A planet is in an elliptical orbit around the Sun.

A

**D** .... Sun .... **B**

C

In which position is the speed of the satellite the greatest?

8. A 4.0 kg point mass experiences a gravitational force of 24 N in a gravitational field. What is the gravitational field strength at the position of the point mass?

A 4.0 N kg^{-1} **B** 6.0 N kg^{-1} **C** 24 N kg^{-1} **D** 96 N kg^{-1}

9. A point mass experiences a gravitational force F when a distance d from a spherical mass M. Another spherical mass $2M$ is placed at a distance $2d$ from the point mass as shown.

M point mass $2M$

d $2d$
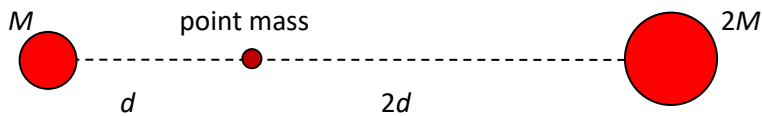
What is the magnitude and direction of the net force on the point mass?

	Magnitude	**Direction**
A	$\dfrac{F}{2}$	Left
B	$\dfrac{F}{2}$	Right
C	$\dfrac{3F}{2}$	Left
D	$\dfrac{3F}{2}$	Right

10. Two particles of masses m_1 and m_2 are a distance d apart.
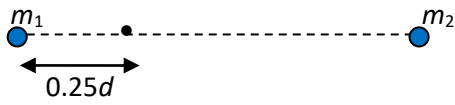
The gravitational field strength on the line joining the particles at a distance of $0.25d$ from m_1 is zero. What is the ratio $\dfrac{m_1}{m_2}$?

A $\dfrac{1}{16}$　　　　**B** $\dfrac{1}{9}$　　**C** $\dfrac{1}{4}$　　　　**D** $\dfrac{1}{3}$

Quiz D17.1 Answers	
1	D
2	C
3	B
4	C
5	D
6	B
7	D
8	B
9	A
10	B