

# Self-test questions

## Topic 8

- Which is a correct description of primary energy sources?
  - They are practically inexhaustible
  - They are being consumed at a rate that is faster than that at which they can be produced
  - They are sources that can be directly used to power machines
  - They are sources that have not been processed in any way
- Which is the function of the moderator in a nuclear fission reactor?
  - to cool the reactor
  - to prevent core meltdown
  - to slow down neutrons
  - to control the rate of reactions
- Which is a correct comparison of active solar devices and photovoltaic panels in relation to energy conversions?

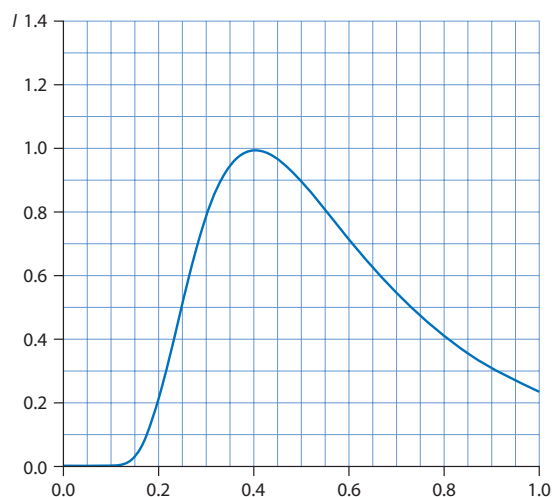
	Active solar devices	Photovoltaic panels
A	solar energy to thermal energy	solar energy to electrical energy
B	solar energy to thermal energy	solar energy to thermal energy
C	solar energy to electrical energy	solar energy to electrical energy
D	solar energy to electrical energy	solar energy to thermal energy

- A wind generator extracts power  $P$  when the wind speed is  $v$ . What is the power extracted when the wind speed doubles?
  - $P$
  - $2P$
  - $4P$
  - $8P$
- In an hydroelectric power station water of density  $\rho$  leaves a dam and flows through turbines an average height  $h$  below the dam at a rate of  $Q \text{ m}^3$  per second. What is an estimate of the power generated by this station?
  - $\rho Qh$
  - $\rho Qgh$
  - $\frac{Qgh}{\rho}$
  - $\frac{\rho gh}{Q}$
- Solids are generally better conductors of heat than gases because they have:
  - more free electrons per unit volume
  - stronger bonds between their molecules
  - higher densities
  - higher specific heat capacities
- A body that is a good approximation to a black body would be described as:
  - a good radiator, a good absorber and a good reflector
  - a good radiator, a good absorber and a poor reflector
  - a poor radiator, a poor absorber and a good reflector
  - a poor radiator, a poor absorber and a poor reflector

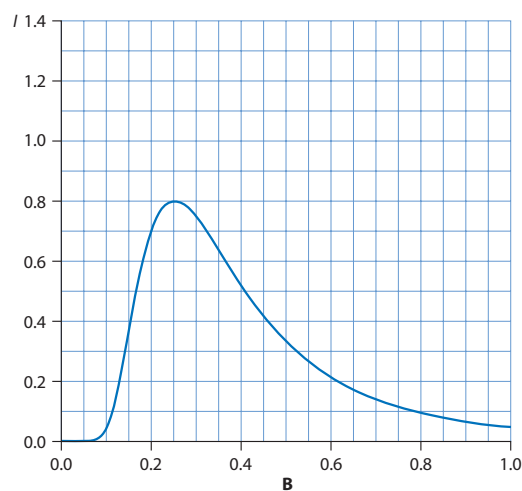
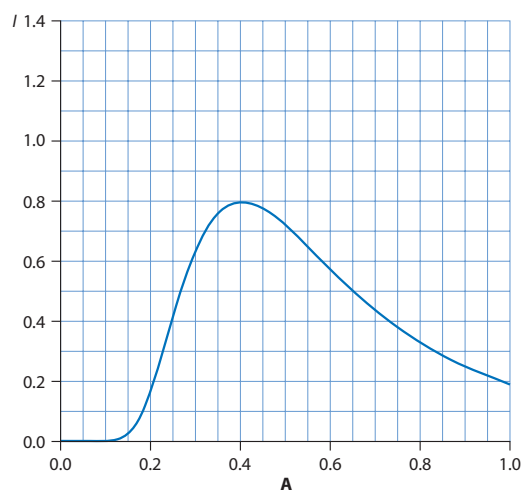
- 8 A black body has kelvin temperature  $T$  and surface area  $A$ . The power radiated by an area of  $1 \text{ m}^2$  of the body is  $P$ . The temperature and area of the body are both doubled. What is the new power radiated by  $1 \text{ m}^2$  of the body?

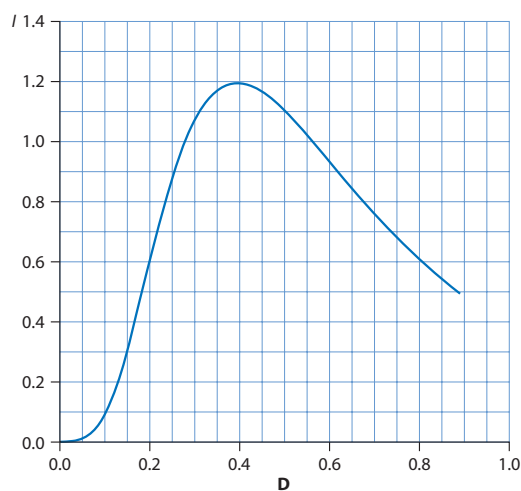
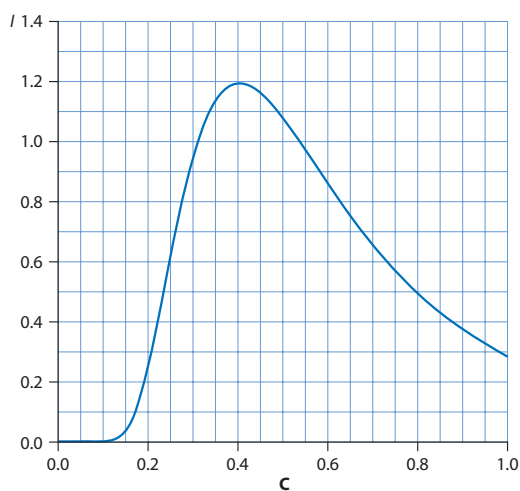
A  $4P$   
 B  $16P$   
 C  $32P$   
 D  $64P$

- 9 The graph shows the variation of intensity with wavelength of the radiation emitted by a spherical body of radius  $R$  and surface temperature  $T$ . The units on the graph are arbitrary.



Which of the following graphs shows the variation of intensity with wavelength for another spherical body of the same radius and temperature but of higher emissivity?





- A
- B
- C
- D

10 The greenhouse effect would be described as:

- A infrared radiation emitted by the Earth is absorbed by greenhouse gases in the atmosphere and is then re-emitted in all directions including the Earth
- B ultraviolet radiation emitted by the Earth is absorbed by greenhouse gases in the atmosphere and is then re-emitted in all directions including the Earth
- C infrared radiation emitted by the Sun is absorbed by greenhouse gases in the atmosphere and is then re-emitted in all directions including the Earth
- D ultraviolet radiation emitted by the Sun is absorbed by greenhouse gases in the atmosphere and is then re-emitted in all directions including the Earth