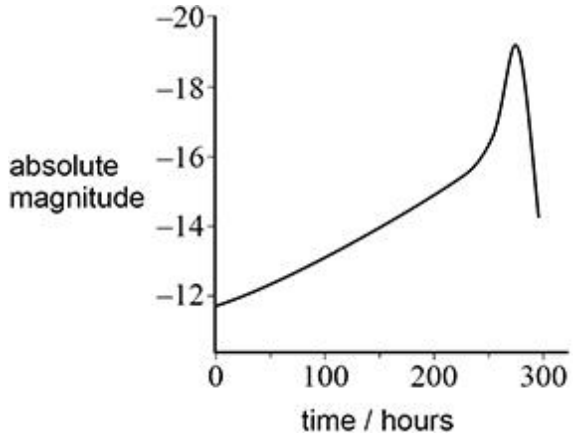
**Name of the Student**:_____
**Max. Marks : 24 Marks** **Time : 24 Minutes**

## Q1.

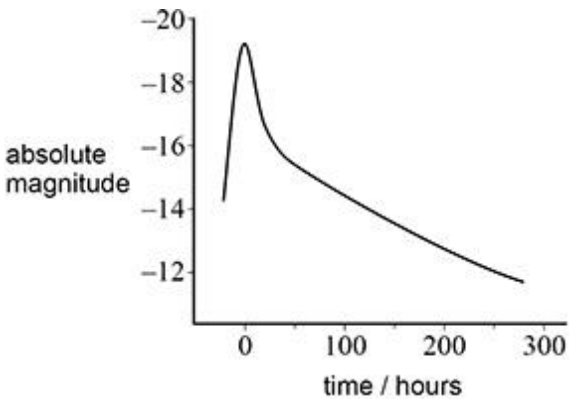
(a) Which graph shows the light curve for a typical type 1a supernova?

Tick (✓) **one** box.

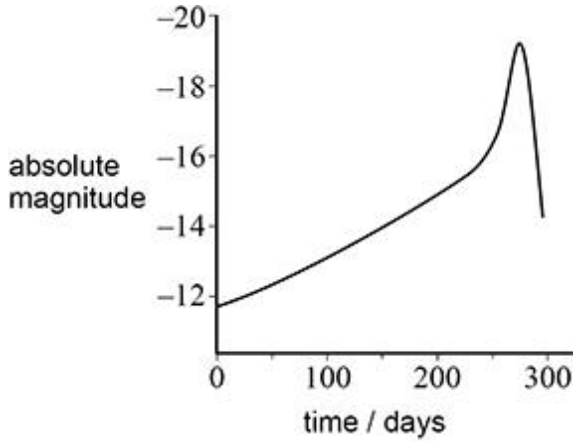
**A**



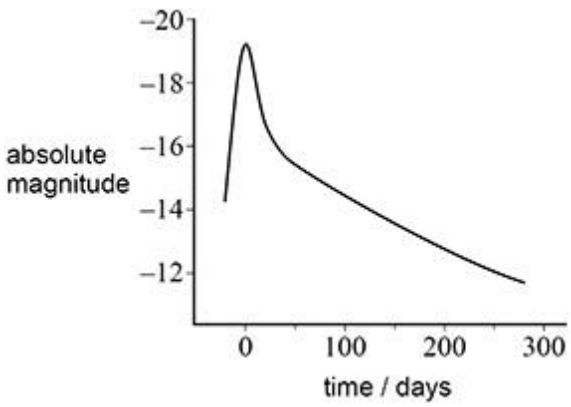

**B**




**C**




**D**




**A** ☐

**B** ☐

**C** ☐

**D** ☐

**(1)**

(b) The Andromeda galaxy is approximately $7.7 \times 10^5$ pc from Earth.

Deduce whether a type 1a supernova which occurred in Andromeda can be observed from Earth with the naked eye.

_____

_____

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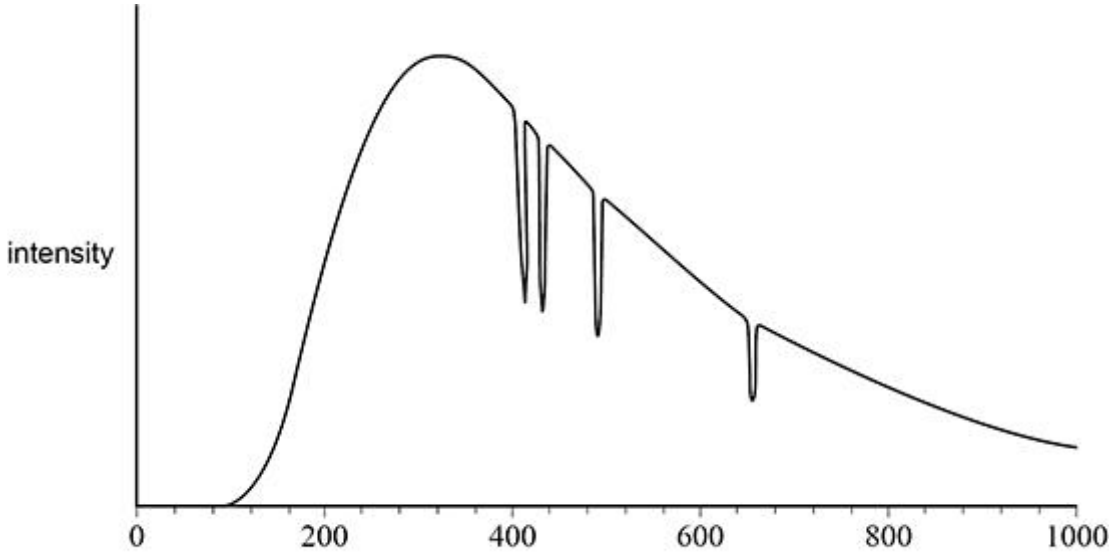
**(3)**

**(Total 4 marks)**

## Q2.

Miaplacidus and Avior are two stars in the constellation Carina.
Miaplacidus is a class A star.
Avior is a class K star.

The figure below shows how the intensity of radiation arriving at the Earth varies with wavelength for **one** of these stars. Only the important features of the variation are shown.




Deduce, with reference to the figure, the identity of the star.

In your answer you should:

- explain the overall shape of the graph
- describe the processes in the star that lead to the decreases in intensity
- state the identity of the star.

**(Total 6 marks)**

## Q3.

IC2497 is a galaxy that contained a quasar. It is believed that the quasar stopped emitting radiation several thousand years ago.

(a) Suggest why the quasar stopped emitting radiation.

_____

_____

_____

_____

_____

**(2)**

(b) IC2497 has a red shift of 0.0516

Determine the distance from the Earth to IC2497.
Give an appropriate unit for your answer.

distance = _____ unit = _____

**(4)**

**(Total 6 marks)**

## Q4.

(a) Explain what is meant by the Rayleigh criterion.

_____

_____

_____

_____

_____

_____

_____

**(2)**

(b) A telescope uses wavelengths in the range 90 nm to 120 nm.

Explain why this telescope must be located in space.

Go on to discuss **one** advantage that this telescope has compared to a telescope with the same aperture that uses visible light.

_____

**(3)**

(c) The table below shows information about two telescopes.

| Telescope | Diameter / m | Dish shape |
|---|---|---|
| Arecibo | 305 | spherical |
| Lovell | 76 | parabolic |

Each telescope detects radio waves with a wavelength of 21 cm.

Compare the performances of the telescopes in the table above when both are used to observe the same faint radio objects.

**(3)**
**(Total 8 marks)**