Conceptual Test

Chapter 24

ASTRONOMY TODAY

6th edition

Chaisson

McMillan

Question 1

Which of the following is NOT one of the basic types of galaxy?

1) spiral
2) lenticular
3) globular
4) irregular
5) elliptical

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Question 2

Which type of galaxy contains the most population II stars?

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2) globular
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(a) M49   Type E2

(b) M84   Type E3
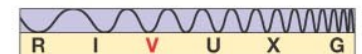
(c) M110   Type E5

R   I   V   U   X   G

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Question 3

Which type of galaxy most resembles our Milky Way?

1) spiral
2) globular
3) irregular
4) elliptical
5) lenticular

Question 3

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Question 4

Which type of galaxy can grow to the greatest mass and possess the largest number of globular clusters?

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2) globular
3) irregular
4) elliptical
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Which type of galaxy can grow to the greatest mass and possess the largest number of globular clusters?

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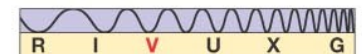(a) M49 Type E2

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| R | I | V | U | X | G |

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Hubble took spectra of galaxies in the 1930s. What did he find?

1) All the galaxies showed blue line shifts.

2) Most galaxies showed redshifts.

3) Galaxies showed about half redshifts and half blueshifts.

4) Galaxies showed no line shifts at all.

5) Some galaxies showed a redshift that changed into a blueshift at other times.

Question 5

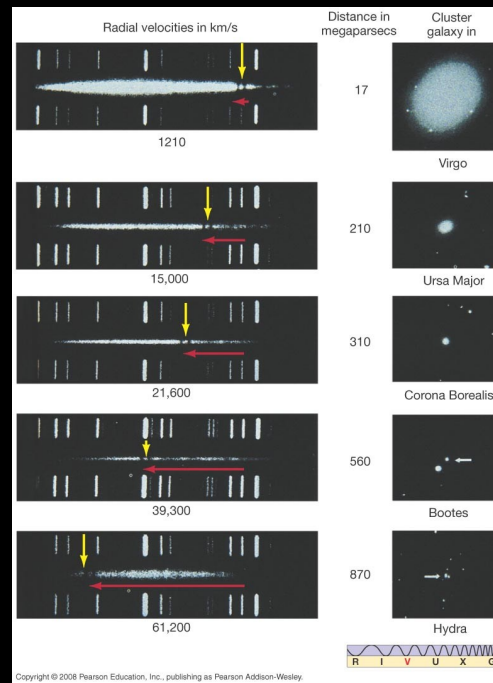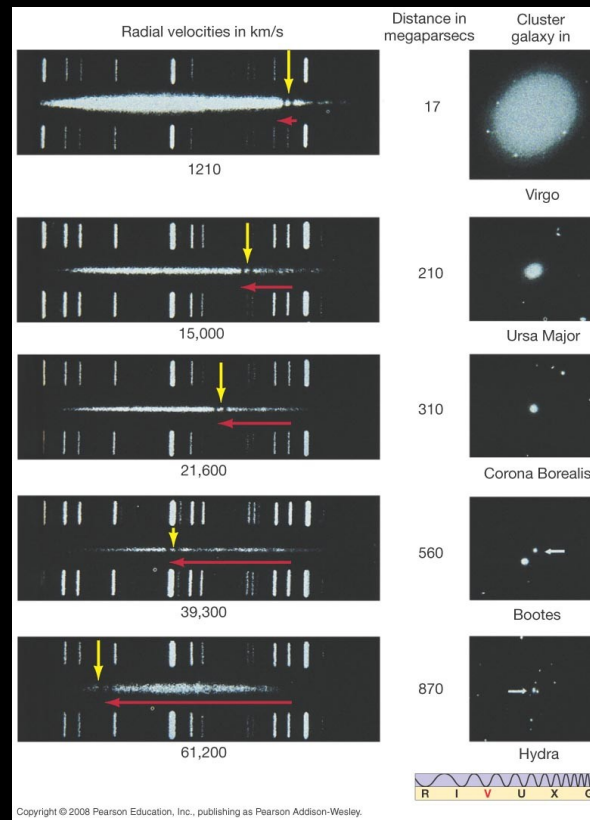**Hubble took spectra of galaxies in the 1930s. What did he find?**

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Question 6

What did the discovery suggest to cosmologists?

1) The universe is static.

2) The universe is collapsing.

3) The universe is expanding.

4) The universe is contracting.

5) There is no accepted interpretation.

Radial velocities in km/s	Distance in megaparsecs	Cluster galaxy in
1210	17	Virgo
15,000	210	Ursa Major
21,600	310	Corona Borealis
39,300	560	Bootes
61,200	870	Hydra

R I V U X G

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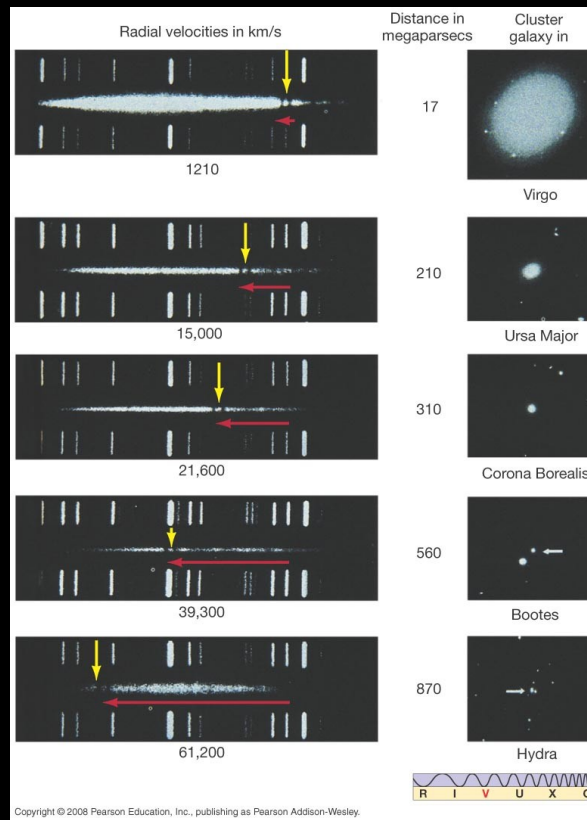# Question 6

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Question 7

Most of the galaxies (99%) are

1) moving around randomly.

2) showing Doppler blueshifts.

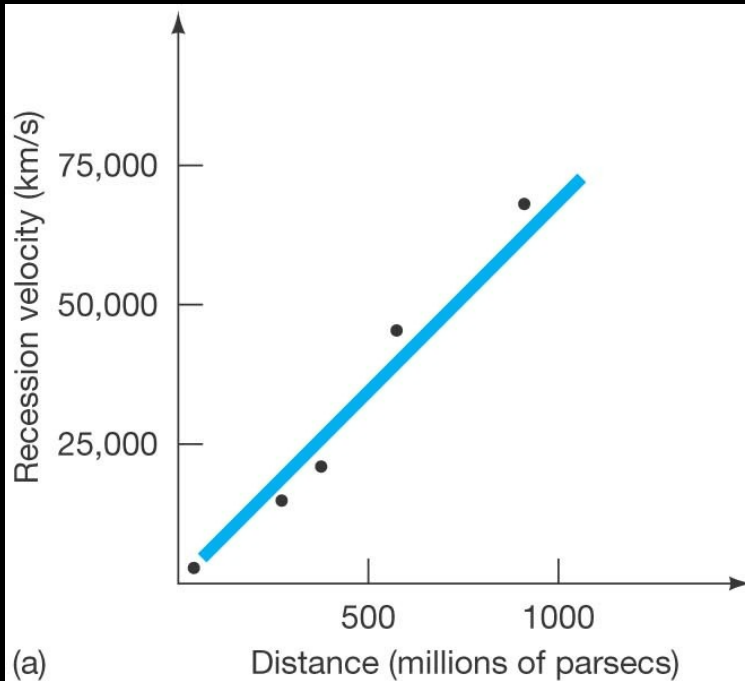3) moving in circles.

4) rushing away from us.

5) approaching us.

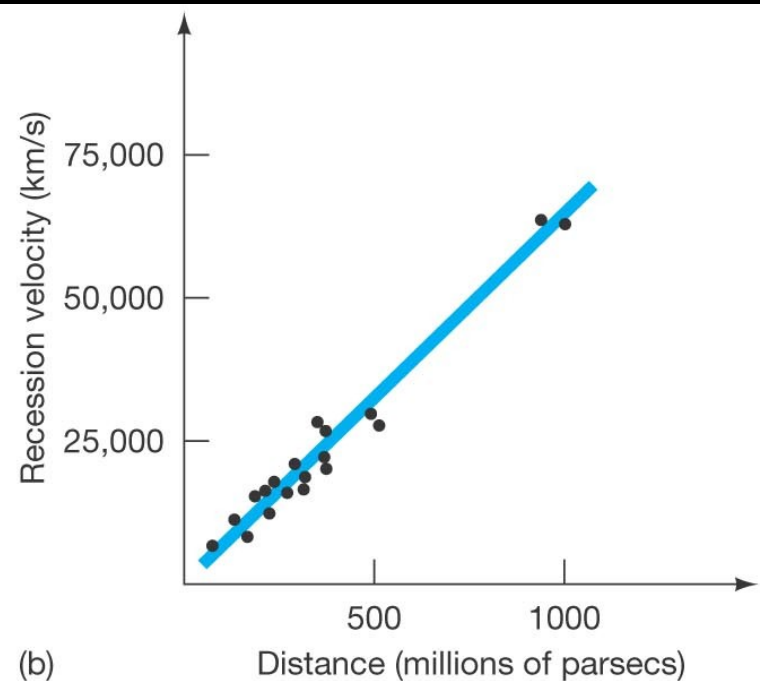# Question 7

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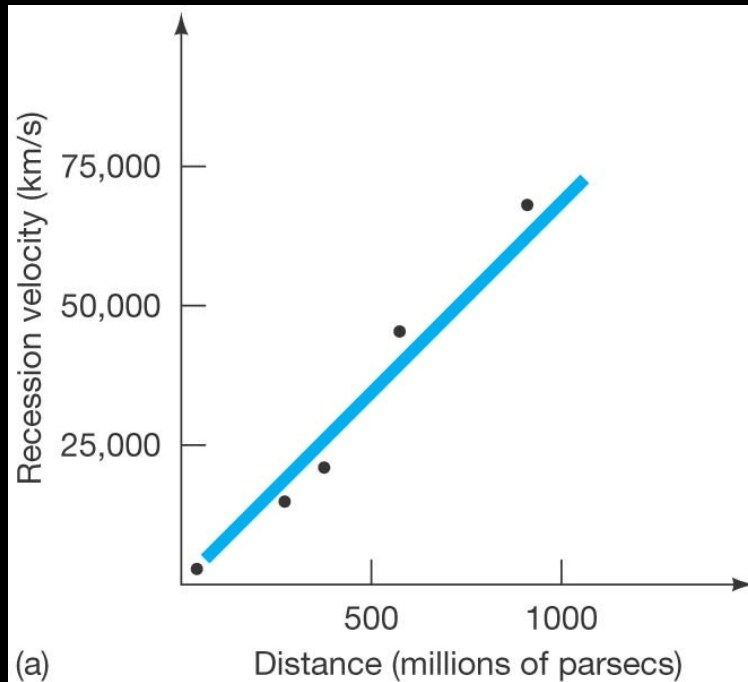Copyright © 2008 Pearson Education, Inc., publishing as Pearson Addison-Wesley.

Question 8

Galaxy distance and Doppler redshift are correlated for galaxies. What do we call that correlation?

1) the Hubble "law"
2) Wein's relation
3) redshift–distance relation
4) period–luminosity relation
5) both 1 and 3

(a) Distance (millions of parsecs)

(b) Distance (millions of parsecs)

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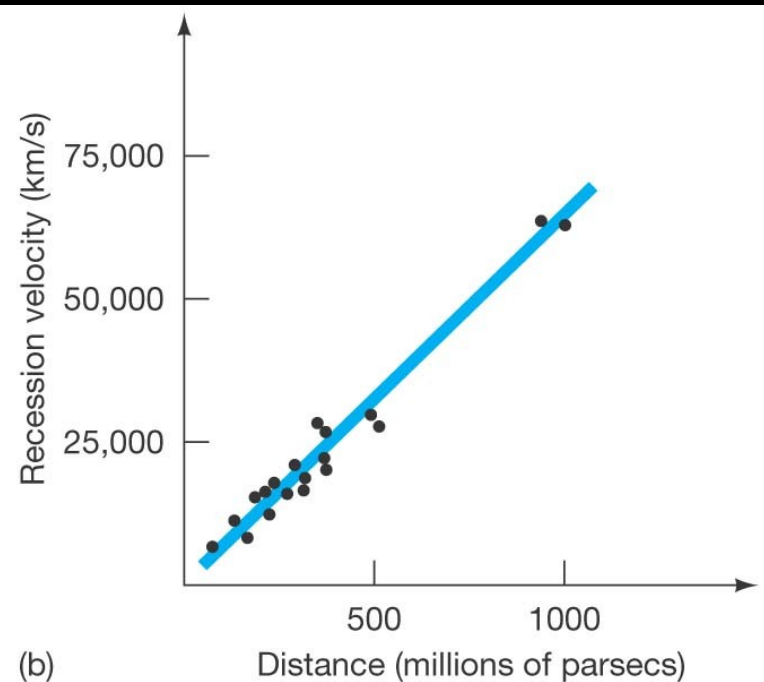
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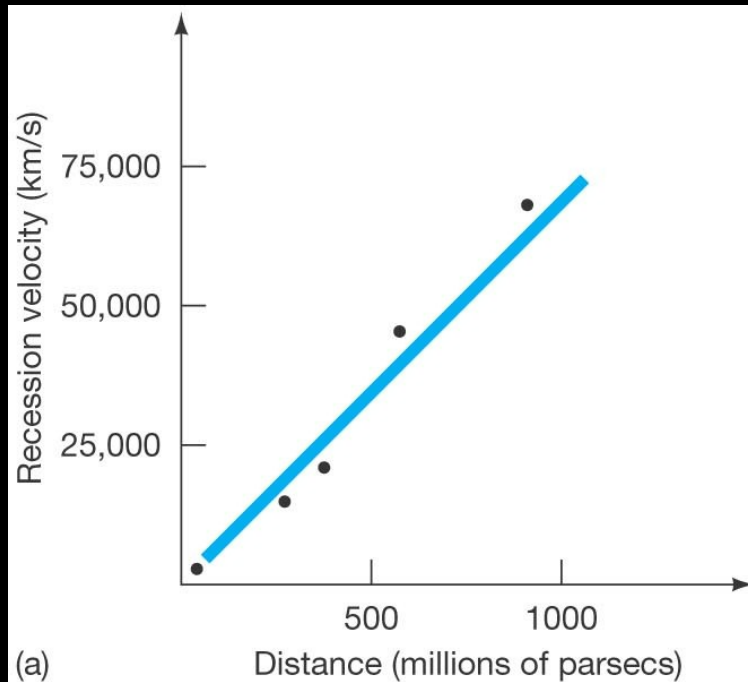
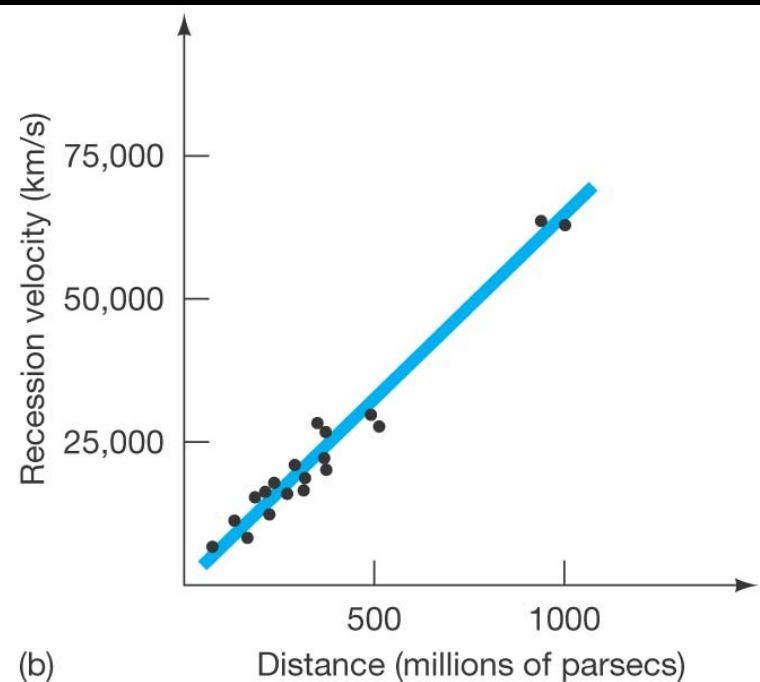**1) the Hubble "law"**
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(a) Recession velocity (km/s) vs. Distance (millions of parsecs)

(b) Recession velocity (km/s) vs. Distance (millions of parsecs)

Question 9

What is the *H* in *V = Hr*?

1) Cepheid relation
2) Hubble constant
3) radial velocity
4) distance in megaparsecs
5) Wien's constant
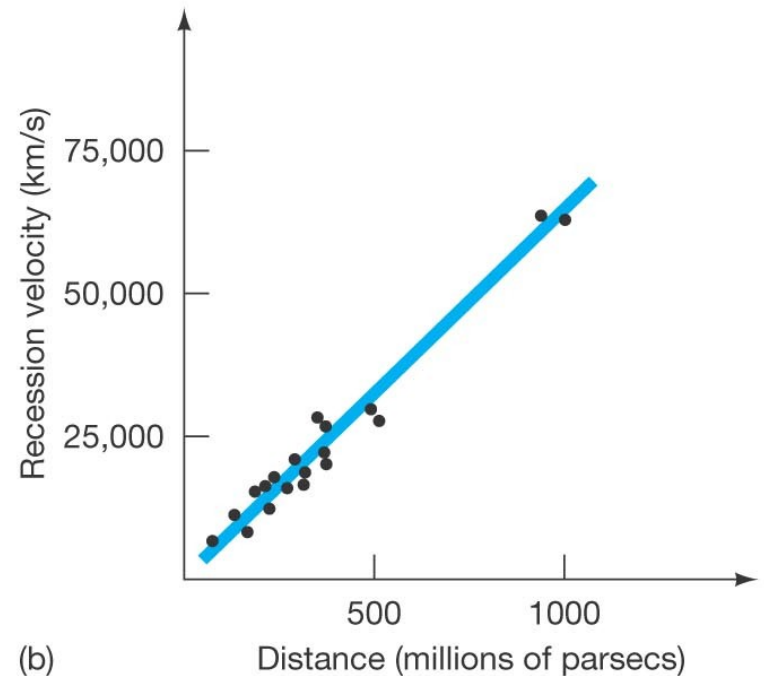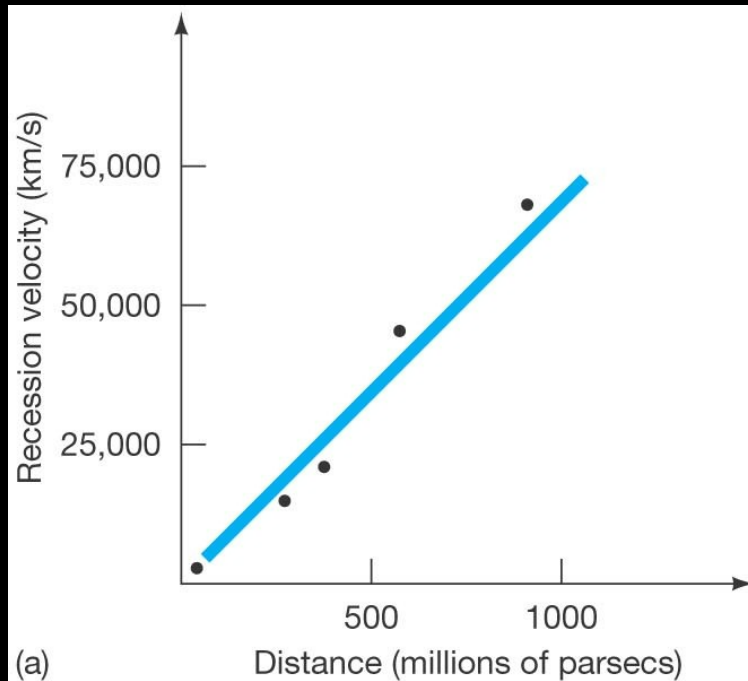
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4) distance in megaparsecs

5) Wien's constant

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We estimate the value of *H* by getting what measure for many galaxies at many different (Doppler redshift) recession velocities?

1) temperature
2) luminosity
3) distance
4) color
5) size
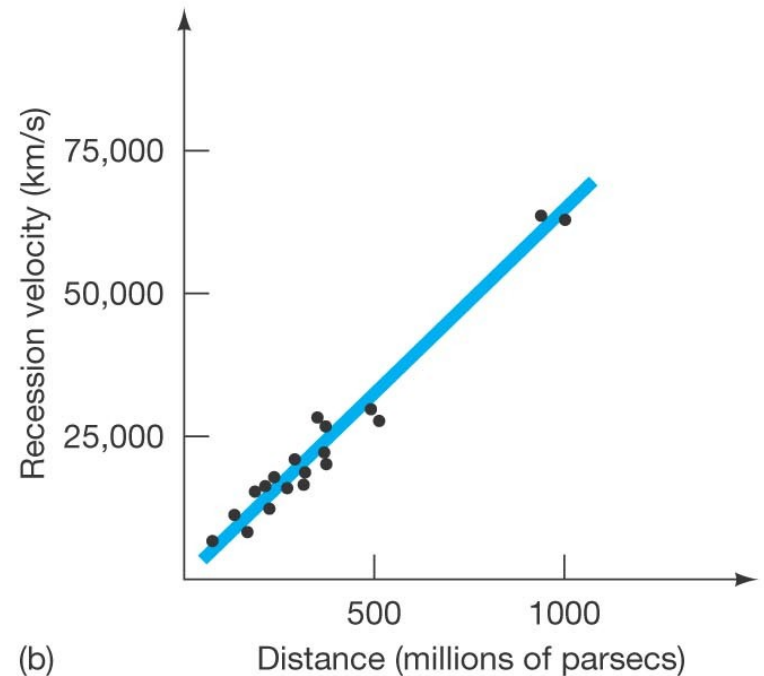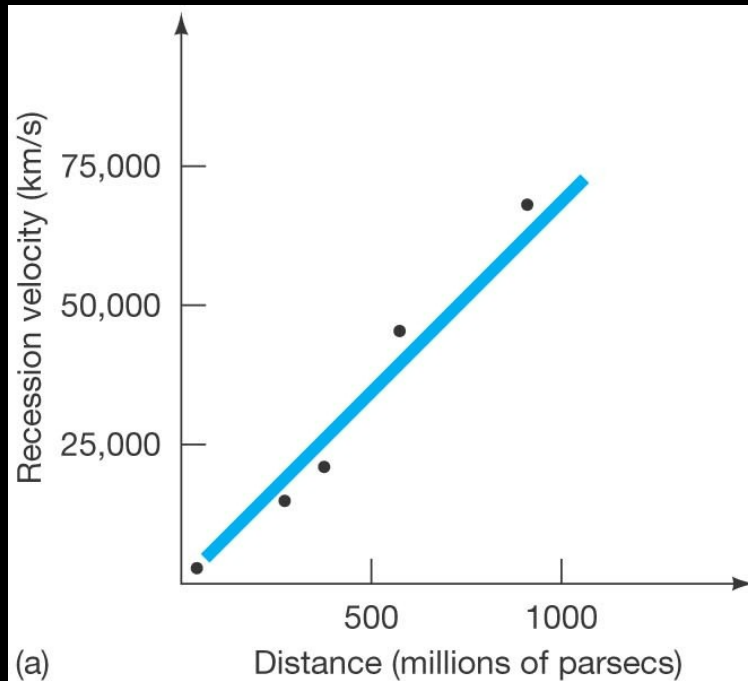
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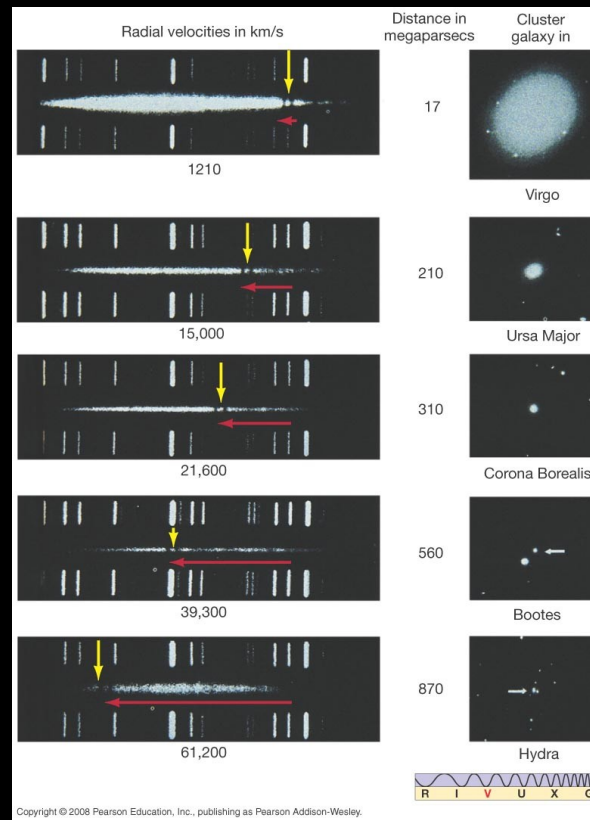
Question 11

_____ galaxies may bridge the gap between spiral galaxies and quasars.

1) Hickson
2) Arp
3) Core–halo
4) Seyfert
5) Hubble

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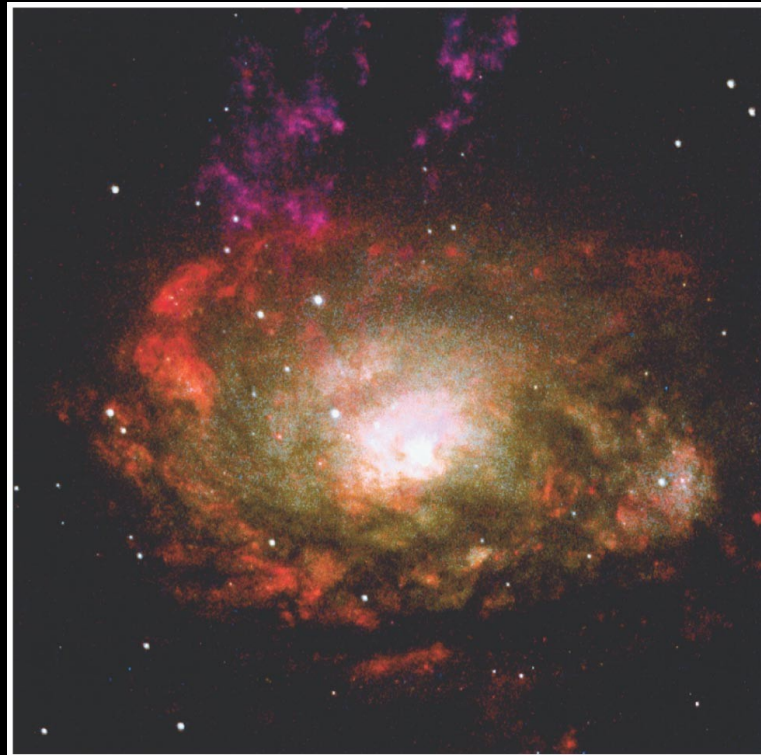
Question 12

Not only does the central engine of active galaxies and quasars require a black hole, but _____ is also needed to provide the energy radiated.

1) a collision with another galaxy
2) an accretion disk of matter
3) a very strong magnetic field
4) a source of very high energy electrons
5) a high rate of rotation of the black hole

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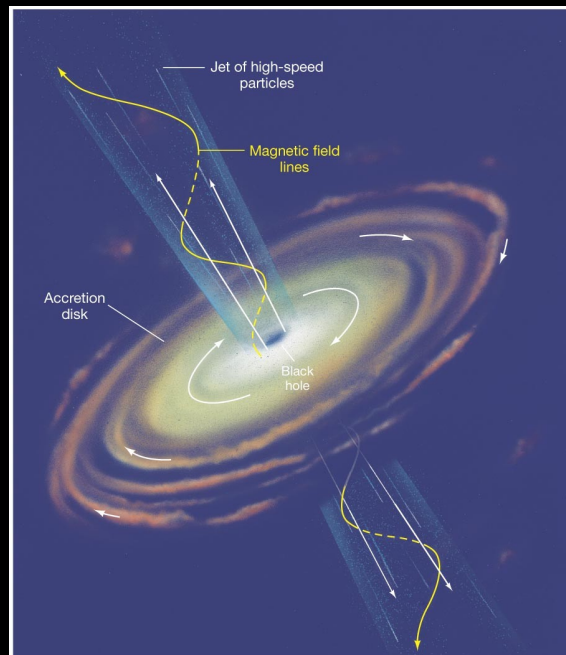
Question 13

How would we get Doppler velocity independent distances to the nearest galaxies (a few megaparsecs)?

1) trig parallax

2) period–luminosity relation for Cepheids

3) Hubble's law ($V = Hr$)

4) radar reflection

5) main sequence fitting

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How would we get Doppler velocity independent distances to more distant galaxies (tens of megaparsecs) without using the Hubble law?

1) trig parallax
2) period–luminosity relation for Cepheids
3) Comparing brightest stars/clusters/nebulae with similar objects in MW.
4) main sequence fitting
5) impossible to do it

Question 14

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3) **Comparing brightest stars/clusters/nebulae with similar objects in MW.**

4) main sequence fitting

5) impossible to do it

Question 15

You see a distant car in the night. What two things must you know in order to estimate its distance?

1) how fast it is moving towards or away from me (Doppler shift)

2) the apparent brightness (flux) of the distant headlights

3) the intrinsic brightness of the headlights (e.g., 500 or 1000 watts)

4) 1 and 2

5) 2 and 3

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Question 16

You see a distant (main-sequence!) B-type star like Rigel in a rather distant galaxy. What two things do you need to know in order to estimate its distance?

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What do you need to know in order to estimate the distance of galaxies where we can no longer see individual stars / clusters / nebulae?

1) trig parallax

2) period–luminosity relation for Cepheids

3) main sequence fitting

4) Supernovae give us a reasonable guess.

5) We cannot do it without $V = Hr$.
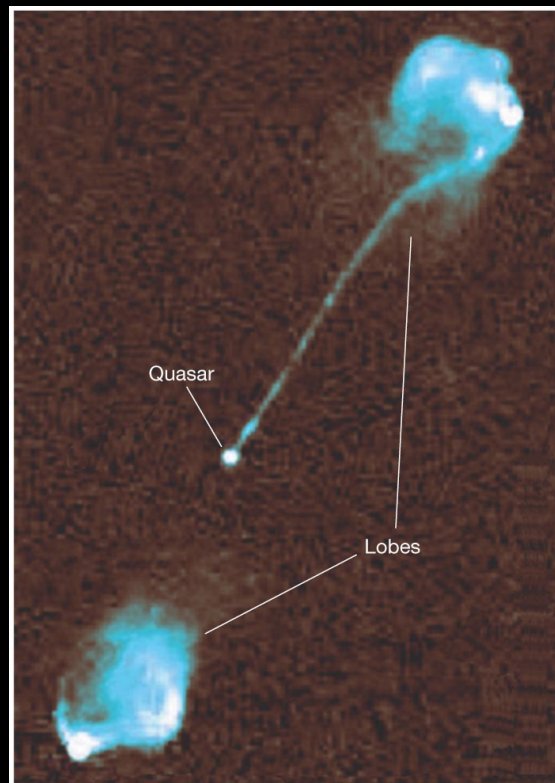
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Question 18

The spectral lines of quasars are

1) emission lines with large redshifts.

2) a continuum from the synchrotron radiation.

3) fuzzy absorption lines from the merged light of the billions of stars.

4) too complex for any interpretation.

5) nonexistent, the gas so hot as to be totally ionized, so no lines are seen.

Quasar

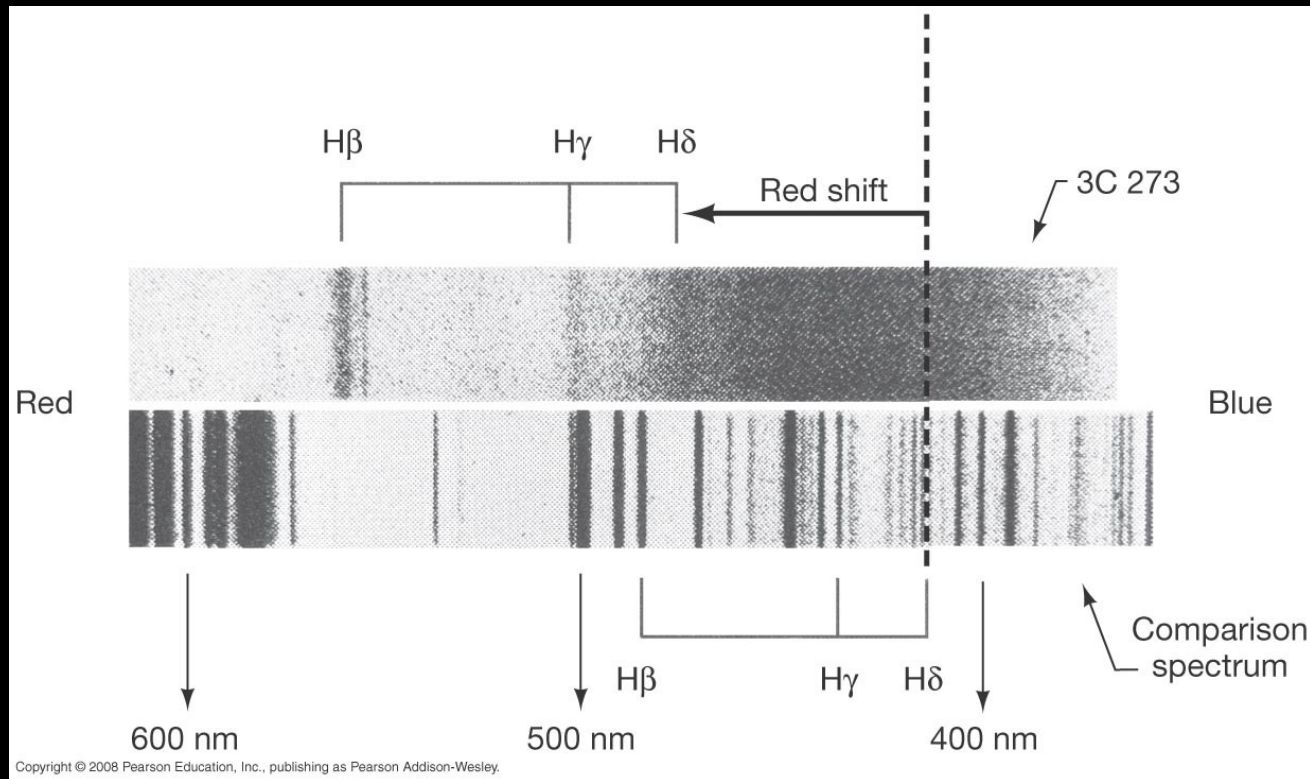Lobes

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Hβ   Hγ   Hδ

Red shift

3C 273

Red

Blue

Hβ   Hγ   Hδ

Comparison spectrum

600 nm   500 nm   400 nm

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Question 19

What is the most likely source of energy for active galaxies and quasars?

1) collisions of large spiral galaxies

2) large clusters of very massive, luminous stars

3) a single supermassive, superluminous star

4) accretion onto a supermassive black hole

5) numerous supernovae from rapid star formation in young galaxies

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Observer sees broad spectrum of radiation

Broad-band radiation

Reradiated infrared radiation

Accretion disk

Supermassive black hole

Observer sees mainly infrared radiation

Dusty donut