

PART B

This part relates mainly to Book 3, Chapters 3 and 4, and carries 50% of the marks for this assignment.

Q7 Which of the features listed in the key do starburst and Seyfert galaxies have in common? Identify the *three* correct items in the key.

KEY for Q7

- A Emission lines that are stronger than those in a normal galaxy. ✓
- B Emission lines of the same width in both types of galaxy. ✓
- C A total energy output that is several times that of a normal galaxy. ✓
- D Far-infrared excess emission. ✓
- E Extra radiation from extended regions in the galactic disc. ✓
- F Extra radiation from a tiny region in the nucleus. ✓
- G Variability. ✓
- H They are equally common types of object. ✓

Pencil across *three* cells in row 7.

Q8 to Q10 These questions are about the host galaxies of various kinds of active galactic nucleus and associated features.

KEY for Q8 to Q10

- A Elliptical galaxies.
- B Irregular galaxies.
- C Spiral galaxies.
- D Lenticular galaxies.
- E The host galaxy has not yet been observed.

Q8 Identify from the key the type of galaxy in which it is believed that radio-loud quasars occur.

Pencil across *one* cell in row 8.

Q9 Identify from the key the type of galaxy in which it is believed that radio-quiet quasars occur.

Pencil across *one* cell in row 9.

Q10 Identify from the key the type of galaxy which it is believed is the only type that can have radio lobes.

Pencil across *one* cell in row 10.

Q11 Which of the statements in the key about clusters of galaxies is false? Select *one* item from the key.

KEY for Q11

- A Most galaxies belong to a cluster (or group) of galaxies. ✓
- B Elliptical galaxies tend to occur in regions where galaxies are more densely clustered together. ✓
- C cD galaxies are often found at the centres of rich clusters. ✓
- D cD galaxies may be a result of galaxy mergers. ✓
- E In rich clusters of galaxies the galaxies are more closely packed than in sparse clusters. ✓
- F Looking at a picture of a cluster of galaxies suggests that all the galaxies in a cluster have their rotation axes aligned the same way. ✓

Pencil across *one* cell in row 11.

Q12 Order the following speeds from smallest to largest.

- (a) The speed of the Sun due to the rotation of the Milky Way.
- (b) The speed of recession of a galaxy with redshift of +0.005. [Hint: see page 58 of Book 1 and page 68 of Book 3.]
- (c) The speed of a point on the Equator of the Earth due to the daily rotation of the Earth on its axis. ✓
- (d) The speed of the Earth in its orbit round the Sun.
- (e) The speed of the Local Group relative to the cosmic microwave background.

KEY for Q12

- A a, b, c, d, e
- B d, a, e, b, c
- C c, d, a, e, b
- D c, d, e, a, b
- E e, c, d, b, a
- F b, e, c, d, a
- G None of A-F.

c d a e b

Pencil across *one* cell in row 12.