

STUDY GUIDE FOR TEST IV

CHAPTER 25: STRUCTURE AND ORGANIZATION OF THE GALAXY

1. nucleus
2. halo
3. dimensions of the Galaxy
4. nature and use of Cepheid variables
5. RR Lyrae variables
6. Kapteyn's result and the reason for it
7. Shapely's result and method
8. the Sun's position in the Galaxy
9. rotation of the Galaxy
10. peculiar velocity
11. distribution of O and B stars
12. hydrogen clouds and the 21 cm emissions
13. mass determination from the Sun's orbit
14. number of stars
15. types of stars near center of the Galaxy
16. implications of high speed clouds near nucleus
17. evidence for a black hole at the center of the Galaxy
18. age of globular clusters
19. amount of matter thought possibly to be in the halo

CHAPTER 26: THE INTERSTELLAR MEDIUM

1. two types of interstellar material
2. two effects of dust grains
3. interstellar extinction
4. scattering and its effect on color
5. use of B-V color index to determine amount of dust in the line of sight of a star
6. alignment of grains and the Galaxy's magnetic field
7. origins of interstellar grains
8. detection of interstellar gas
9. diffuse clouds (size and mass)
10. emission nebula
11. H II regions
12. reflection nebula and its color
13. dark clouds and the detection of molecules
14. organic molecules in dark clouds

15. movements of diffuse clouds and effect of supernova and stellar winds
16. superbubbles

CHAPTER 27: THE FORMATION AND EVOLUTION OF THE GALAXY

1. Population I stars, Population II stars, and the distribution of heavy elements
2. disk population
3. abundance gradient
4. high velocity stars
5. "cycling" of interstellar material
6. density wave theory
7. effect of density wave on distribution of young stars
8. possible cause of density wave
9. significance for the distribution of Pop II stars and globular clusters to the early structure of the Galaxy
10. starburst galaxy

CHAPTER 28. THE NATURE OF THE NEBULAE

1. elliptical galaxies and subclasses
2. spiral galaxies and subclasses
3. barred spirals
4. tuning fork diagram
5. Type I and Type II irregulars
6. Cepheid variables as distance estimators
7. brightest stars and supernovae as distance estimators
8. apparent diameter as distance estimator
9. brightest galaxies in a cluster as distance estimators
10. Tully-Fisher method
11. rotational velocity and rotation curve in mass determination
12. velocity dispersion and its cause in elliptical galaxies
13. use of binary galaxies in mass determination
14. dwarf ellipticals
15. mass-to-light ratio for elliptical and spiral galaxies

16. evolutionary reason for the shape of elliptical galaxies
17. role of halo in bar formation

CHAPTER 29: CLUSTERS AND SUPERCLUSTERS: THE DISTRIBUTION OF THE GALAXIES

1. cluster
2. Local Group
3. Andromeda Galaxy
4. size of the Local Group
5. Magellanic Clouds
6. migration of large galaxies in rich clusters
7. effect of gravitational interactions on spiral galaxies
8. two methods for determining mass of a cluster
9. temperature and composition of intercluster gas
10. superclusters and their structure
11. top-down theory
12. bottom-up theory
13. dark matter
14. cause of filament structure of superclusters
15. cosmic strings

CHAPTER 30: UNIVERSAL EXPANSION AND THE COSMIC BACKGROUND

1. Hubble's discovery/Hubble's Law
2. expansion of the universe
3. age determination of universe from H
4. determination of distance of a galaxy from its redshift
5. big bang
6. Gamow's prediction
7. discovery of Penzias and Wilson and its significance
8. microwave background/3-degree background radiation and its cause
9. isotropy of microwave background
10. movement of Local Group relative to Virgo Cluster
11. streaming motion and the "great attractor"

CHAPTER 31: PECULIAR GALAXIES, EXPLOSIVE NUCLEI, AND QUASARS

1. radio galaxies
2. radio lobes and ejected jets
3. ejected gas from galactic cores
4. production of jets
5. Seyfert galaxies
6. quasars and their redshifts
7. BL lac objects
8. time when quasars lived
9. radio and X-ray emissions by quasars
10. jets from quasars
11. light variation of quasars
12. absorption lines in quasar spectrum and two possible causes
13. probable relationship of quasars, Seyfert galaxies, and normal galaxies
14. possible power source for quasars

CHAPTER 32: COSMOLOGY: PAST PRESENT, AND FUTURE OF THE UNIVERSE

1. cosmology
2. cosmogony
3. "underlying assumptions" (applications of physical laws, homogeneity, isotropy)
4. Cosmological Principle
5. general theory of relativity and its implications for moving objects, space, and the expanding universe
6. curvatures of the universe (open universe, closed universe, flat universe)
7. two approaches to testing for openness or closedness
8. methods for estimating total mass and results
9. places where dark matter may be
10. methods for estimating deceleration
11. inflationary universe and its advantages
12. history of the first few minutes of the universe
13. time of formation of galaxies and clusters
14. scenario for the two possible endings of the universe