4188/AP1 **MAY 2011**

INTRODUCTION TO THE COSMOS

Time : Three hours Maximum : 100 marks

PART A — (8 × 5 = 40 marks)

Answer any EIGHT questions.

1. Derive the formula for length of a circular arc.

2. Write notes on conic sections.

3. State and explain the Newton's laws of motion and Gravitation.

4. Write a note on natural and artificial satellites? Give examples.

5. Draw the latitudes and longitudes on Earth and explain.

6. What are celestial coordinates?

7. Write notes on constellations.

8. Explain the Parallax method of determining the distances.

9. State and explain the Kepler's laws of planetary motion.

10. What are occultations? Give an example for it.

PART B — (4 × 15 = 60 marks)

Answer any FOUR questions.

11. (a) Show that each trigonometric function of an angle is equal to the corresponding co-function of its complement.

(b) Find the value of sin(75°).

12. Explain :

(a) Electromagnetic spectrum and

(b) Radio Astronomy with proper diagrams.

13. Explain the following in detail : Infrared astronomy, UV astronomy and X-ray astronomy.

14. Describe the celestial sphere, diurnal motion and transits of celestial objects.

15. Write notes on the following coordinate systems : horizontal system, equatorial system, meridian system and ecplitic system.

16. Explain the: (a) different units of distances in astronomy, (b) Kirchoff's laws in spectroscopy.

17. Describe the Lunar and Solar eclipses with suitable diagrams. Also mention the different types of solar eclipses.

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MAY 2011

SOLAR SYSTEM STUDIES

Time : Three hours Maximum : 100 marks

PART A — (8 × 5 = 40 marks)

Answer any EIGHT questions.

1. What are terrestrial planets and jovian planets?
2. Write notes on solar neutrinos.
3. Explain the solar cycle.
4. Write notes on the tides.
5. Give an account of Phobos and Deimos.
6. Explain about the atmosphere of Jupiter.
7. Which planet is not considered as a planet? Why?
8. Distinguish between artificial and natural satellites. Give examples.
9. Write a note on Oort cloud.
10. Compare the asteroids and meteoroids.

PART B — (4 × 15 = 60 marks)

Answer any FOUR questions.

11. Explain the formation of the Sun and the Planets in detail.
12. Draw the structure of the Sun and different layers. Describe the properties of each layer.
13. Explain the origin of moon and its topography.
14. Explain the internal structure and atmospheres of the Earth.
15. Describe the properties of the planets Mercury and Venus and compare them.
16. Write an essay on the planet Saturn.
17. Explain the internal structure and atmosphere of Uranus and Neptune.

STELLAR ASTRONOMY

Time : Three hours Maximum : 100 marks

PART A – (8 × 5 = 40 marks)

Answer any EIGHT questions.

1. What are the different motions of stars?
2. Define Protostars and T-tauri stars.
3. What are low mass stars? Explain the final stages of low mass stars.
4. Define the Chandrasekar' s limit. Also write the importance of it.
5. Distinguish between white dwarf and black dwarf.
6. What are binary stars? Write briefly about them.
7. What is a planetary nebulae? Explain the formation of it.
8. Write notes on high mass stars.
9. Describe the process of Helium capture.
10. What are Pulsars? How do you detect them?

PART B — (4 × 15 = 60 marks)

Answer any FOUR questions.

11. Explain the luminosity, brightness and magnitudes of stars.
12. With the neat Hertsprung-Russell diagram, explain the different parts of it.
13. Explain the Stellar evolution and various stages of a star.
14. Discuss the different types of star clusters in detail with suitable diagram.
15. Describe the occurrence of stellar explosions, Nova and Super Nova.
16. What are neutron stars? Explain the important properties and observations of them.
17. Write an essay on the formation, detection, properties of Black Holes.

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4191/AP4 **MAY 2011**

GALAXIES AND COSMOLOGY

Time : Three hours Maximum : 100 marks

PART A — (8 × 5 = 40 marks)

Answer any EIGHT questions.

1. Explain the formation of a galaxy.
2. What are Megellanic clouds? Explain them.
3. Write down the Tully-Fisher relationship and explain.
4. State and explain the Hubble's law.
5. What are Jets and lobes in radio galaxies?
6. What are Quasars? How they are used as cosmological probes?
7. Define cosmology and Olber's paradox.
8. What is called as CMB? Write notes on it.
9. Draw the Planck's radiation curve and explain.
10. Distinguish between radiation era and matter era.

PART B — (4 × 15 = 60 marks)

Answer any FOUR questions.

11. Describe the structure and dynamics of Milky way galaxy.
12. Explain the Hubble's classification of galaxies with a tuning-fork diagram.
13. Write an essay on the Active galaxies.
14. What are Seyfert galaxies? Explain them in detail.
15. Discuss the mass-energy relation, particle production and radiation era.
16. Explain the following in detail: (a) Grand Unified Theory and (b) matter era.
17. Discuss the possible geometries and evolution of the universe with suitable diagram.