ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27

PG OPEN ELECTIVE - III SEMESTER

SEMESTER EXAMINATION: NOVEMBER 2020

PHOE 9418 – ASTROPHYSICS

Time- 1½hrs

Max Marks-35

This paper contains TWO printed pages and 3 parts

PART – A

Answer any fifteen. Each question carries ONE mark.

[1 x 15 = 15]

1. The size of the atom is approximately _____ larger than the size of the nucleus.
   a. 10 times
   b. 1000 times
   c. 10000 times
   d. 100000 times

2. Science comes from a Latin word 'Scientia' which means
   a. Wisdom
   b. Understanding
   c. Knowledge
   d. Discernment

3. Only 4 % of the known universe is made of _____
   a. Luminous matter
   b. Dark matter
   c. Dark energy
   d. Ether

4. Which scientist postulated that the earth was a sphere, and it rotated about its axis. This accounted for the circular movement of the heavenly bodies.
   a. Pythagoras
   b. Eudoxus
   c. Plato
   d. Ptolemy

5. Who among the scientists mentioned below are not contemporaries?
   a. Galileo Galilei
   b. Johannes Kepler
   c. Sir. Issac Newton
   d. Edwin Hubble

6. Planets in the Habitable zone have just the right _____ for life.
   a. Temperature
   b. Luminosity
   c. Atmospheric composition
   d. Surface area.

7. What is the shape of Earth's orbit?
   a. Ellipse with low eccentricity
   b. Eclipse with low excitability
   c. Ellipse with high eccentricity
   d. circle

8. We can use _____ to find out what stars are made of
   a. Electromagnetic absorption spectral lines
   b. Telepathic radiation barriers
   c. Telescopes
   d. Periscopes

9. The telescope in our college is ___ in _____ telescope
   a. 8, refracting
   b. 8, reflecting
   c. 6, refracting
   d. 6, reflecting

10. Which scientist discovered that light is an electromagnetic wave?
    a. Michael Faraday
    b. Wilhelm Ritter
    c. Paul Villard
    d. James Clerk Maxwell

11. Which of these rays are blocked completely by the earth's atmosphere?
    a. X rays
    b. UV rays
    c. Infrared rays
    d. Radio waves

12. As the object approaches the speed of light, its mass becomes _____
    a. Zero
    b. double
    c. Remains the same
    d. infinite

13. In the sci-fi movie interstellar, how does Cooper intend to get the low-on-fuel ship to Edmunds' planet?
    a. Using fire extinguishers as thrusters
    b. using Gargantua's gravitational pull as slingshot
    c. Jettisoning excess weight, like TARS
    d. Option b and c both.
14. Stars fall into this category when nuclear fusion begins in their core and when they reach hydrostatic equilibrium
    a. Red giant   b. Main sequence
    c. White dwarf   d. black hole
15. Einstein recognized that motion itself must affect _____
    a. The rate at which clocks tick   b. the length of measuring tapes
    c. Both a and b   d. neither a nor b.
16. The total number of stars in the observable universe is about _____
    a. 100 billion
    b. The same as the number of grains of sand on all the beaches on earth
    c. The same as the number of grains of sand in a large 1-meter cube box
    d. The same as the number of atoms that make up the earth.
17. Which among these is the largest star?
    a. Betelgeuse   b. Proxima Centauri
    c. UV scuti   d. Canis Majoris
    e. Why is Earth a privileged planet?
    a. Because we live on it   b. Because it is designed for discovery
    c. Because it supports life   d. All of the above
    f. Name the Scientist who discovered that our Universe is expanding?
    a. Sir Isaac Newton   b. Sir William Herschel
    c. Edwin Hubble   d. Nicholas Copernicus
    g. What is the most abundant element in the Earth's atmosphere?
    a. Argon   b. Carbon dioxide
    c. Nitrogen   d. Oxygen

PART – B

Answer any THREE QUESTIONS. Each question carries 5 marks.[3 x 5 = 15]

h. What is the significance of space-based observations?

i. What was the paradox between Newtonian physics and Maxwell's equations? How did Einstein resolve this paradox? Discuss briefly.

j. Stephen Hawking in his book 'Grand Design' brings out an argument that is self-refuting. Discuss briefly on the nature of the argument and why it is self-refuting from the basis of the law of cause and effect.

k. Write a note on the size and distance of cosmological objects.

l. Explain why the universe is often called a Tri-Universe.

PART – C

This question carries five marks   [1 x 5 = 5]

m. Explain in about 150 words your journey through the cosmos in the CBCS class.

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