PHYSICS

BOOKS - TARGET PUBLICATION

LIFE CYCLE OF STARS

Exercise

1. Fill in the blanks :

Our galaxy is called .....

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2. Fill in the blanks :

Milky way is a .....

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3. Fill in the blanks :

Our galaxy is rotating around an axis passing through its centre and perpendicular to its plane with period of rotation about .....

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4. Fill in the blanks :

There are about ..... Stars in our galaxy .

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5. Fill in the blanks :

Stars are spheres of ..... gas .

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6. Fill in the blanks :

Surface temperature of the sun is .....

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7. Fill in the blanks :

The masses of other stars are measured relative to the mass of the .....

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8. Fill in the blanks :

Stars are born out of ..... clouds .

9. Fill in the blanks :

For measuring large distances ..... Is used as a unit .

10. Fill in the blanks :

The speed of light is ..... Km/s .

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11. Fill in the blanks :

Light takes ..... To reach us from the sun while it takes ..... To reach us from the moon .

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12. Fill in the blanks :

Huge clouds of gas and dust present in the empty spaces between stars in a galaxy are called .....

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13. Fill in the blanks :

When a spheres of gas contracts its temperature increases due to transformation of its ..... energy into heat energy .

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14. Fill in the blanks :

In stars , ... Depends on the density and temperature of the gas .

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15. Fill in the blanks :

..... Of a star means change in its properties with time resulting in its passing through different stages .

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16. Fill in the blanks :

When gravitaitional force of a star becomes ..... Than its gas pressure , the star starts contracting .

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17. Fill in the blanks :

The number of fuels used in the life of a star depends on its .....

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18. Fill in the blanks :

The larger the mass of a star the faster is its .....

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19. Fill in the blanks :

The end stage of the sun will be .....

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20. Choose the correct alternative :

The solar system is situated at a distance of .....

A. 3 x 10^8 km from centre of milky way

B. 12 x 10^16 km from periphery of milky way

C. 2 x 10^17 km from centre of milky way

D. 2 light years from periphery of milky way

Answer: A::B::C

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21. Choose the correct alternative :

Stars observed in the universecan exhibit masses between (M_sun / 10) to ..... And radii between ..... To 1000 times the radius of the sun .

A. 100 M _sun 1/10

B. 100 M _sun 1/100

C. 1000 M _sun 1/100

D. 1000 M _sun 1/10

Answer: A

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22. Choose the correct alternative :

Life span of our sun from birth till it becomes red giant is of .....

A. 4.5 x 10^9 to 5 x 10^9 years

B. 8.5 x 10^9 to 9.5 x 10^9 years

C. 4.5 billion years

D. 4.5 million years

Answer: A

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23. Choose the correct alternative :

When a star undergoes expansion ,

A. it is going to turn into a black hole

B. its gravitational force is greater than pressure of hot gasses constituting the star

C. its gravitational force is smaller than pressure of hot gasses constituting the star

D. it is stable

Answer: A::B::C::D

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24. Choose the correct alternative :

Sirius A is known as the brightest star in the night sky . If the star will undergo evolution to end as a white dwarf then its mass is .....

A. 2.02 M_{sun}

B. 9.7 M_{sun}

C. 13 M_{sun}

D. 30.5 M_{sun}

Answer: B

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25. Choose the correct alternative :

A star in our galaxy exploded about 7500 years ago . The light emitted in the explosion took 6500 years to reach the earth and the star is

A. 2.25 x 10^12 km

B. 7500 light years

C. 1.95 x 10^12 km

D. 6500 light years

Answer: A

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26. Name the following :

The type of energy which when generated inside dense sphere of hot gas , a star is formed .

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27. Name the following :

The element acting as a fuel in energy

generation in the sun .

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28. Name the following :

The element which constitute 26% of the mass of the sun .

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29. Name the following :

The star closest to the sun .

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30. Name the following :

The property present in sun in absence of which the sun will collapse to a point in 1-2 hours .

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31. Right or wrong . If wrong , write the correct sentence :

The empty space between stars in a galaxy is completely devoid of any matter .

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32. Right or wrong . If wrong , write the correct sentence :

The sizes of interstellar clouds are about a few kilometres.

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33. Right or wrong . If wrong , write the correct sentence :

Light year is used to measure time .

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34. Right or wrong . If wrong , write the correct sentence :

More than one star can be produced by contraction of a huge interstellar cloud .

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35. Right or wrong . If wrong , write the correct sentence :

End stage of a star depends on its initial mass .

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36. Right or wrong . If wrong , write the correct sentence :

When stars are divided on the basis of their evolution depending on initial mass into three

groups , path of evolution and end stage for all stars in all groups is same .

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37. Right or wrong . If wrong , write the correct sentence :

The sun will end its life as a white dwarf .

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38. Right or wrong . If wrong , write the correct sentence :

When the sun will become a red giant , its diameter will increase so much that it will swallow mercury and venus .

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39. Right or wrong . If wrong , write the correct sentence :

The sun will pass through the supergiant stage during its evolution .

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40. Right or wrong . If wrong , write the correct sentence :

A star ends its life as a neutron star when the pressure of its electrons balances its gravity .

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41. Right or wrong . If wrong , write the correct sentence :

Only light can emit from the black hole .

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42. Complete the analogy :

Radius of sun : 695700 km :: mass of sun : .....

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43. Complete the analogy :

M_sun : unit of mass :: light year : .....

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44. Complete the analogy :

1 M_sun : 2 x 10^30 kg :: 1 light year : .....

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45. Complete the analogy :

Gravitational force : to bring the gas particles close together :: pressure of hot gas : .....

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46. Complete the analogy :

Stable star : gravitational force = gas pressure : : contracting star : .....

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47. Match the following :

Match the initial mass of the star (M) given in column I with end stage of the star given in column II .:

	Column I		Column II
i.	$M > 25M_{Sun}$	a.	White dwarf
ii.	$M < 8M_{Sun}$	b.	Black hole
iii.	$8M_{Sun} < M < 25M_{Sun}$	c.	Supernova
		d.	Neutron star

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48. Answer in one sentence :

What is galaxy ?

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49. Answer in one sentence :

Why is the sun an ordinary star in the universe ?

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50. Answer in one sentence :

What is the source of nuclear energy in our sun ?

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51. Answer in one sentence :

How long does it take for light to reach the earth from alpha centauri ?

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52. Answer in one sentence :

What will happen to the sun if there was no gas pressure in the sun ?

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53. Answer in one sentence :

Why does energy of star decrease ?

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54. Answer in one sentence :

Why do stars evolve ?

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55. Answer in one sentence :

How are mass of a star and number of fuels used in its energy generation related ?

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56. Answer in one sentence :

What is supernova explosion ?

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57. Answer in one sentence :

Which types of stars and their life as a neutron star ?

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58. Answer in one sentence :

What are the three end stages of stars ?

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59. Answer the following :

What are different type of galaxies ? On what basis these types are classified ?

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60. Answer the following :

How did we obtain all the information about the universe ? If we look at the sky at night we see only planets and stars , then how did we

get information about the other components of the universe ?

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61. Answer the following :

State properties of the sun .

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62. Answer the following :

If you are the sun , write about your properties

in your own words .

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63. Answer the following :

How can scientists conclude that properties of the sun have remained unchanged since its birth ?

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64. Answer the following :

Derive the relation :

1 light year = 9.5 x 10^12 km .

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65. Answer the following :

How do stars form ?

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66. Answer the following :

Why doesn't the hot gas in the stars disperse in space ?

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67. Answer the following :

Why have the properties of the sun remained unchanged over the last 4.5 billion years ?

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68. Answer the following :

Explain the process of evolution of stars .

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69. Answer the following :

How does the evolution of star finally stop ?

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70. Answer the following :

Explain the life cycle of stars having initial mass less than 8 times mass of the sun .

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71. Answer the following :

Describe white dwarfs .

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72. Answer the following :

Write a short note on white dwarfs .

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73. Answer the following :

For a star a mass 6M_sun what will balance its gravitational force at its end stage ? Why ?

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74. Answer the following :

Describe the evolution and end stages of stars having initial mass between 8 and 25 times the mass of the sun .

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75. Answer the following :

Consider two identical boxes . Suppose box A is completely filled with material of white dwarf and box B with that of neutron star ,

which box would weigh more on the earth ? Why ?

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76. Answer the following :

Explain end stages of stars having mass larger than 25 times mass of the sun .

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77. Answer the following :

Why was the name black hole given ?

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78. Distinguish between :

White dwarf and neutron star

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79. Distinguish between :

White dwarf and black hole

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80. Complete the given chart/ table :

Following table explains the conditions during evolution of a star . Compare the conditions with the temperature , pressure of the gas (P) and the gravitational force (F_G) between gas

particles and complete the following table .:

[3 Marks]

Stages of star	Relation between P and F_G	Temperature
Stable		
	$P < F_G$	
		Increases

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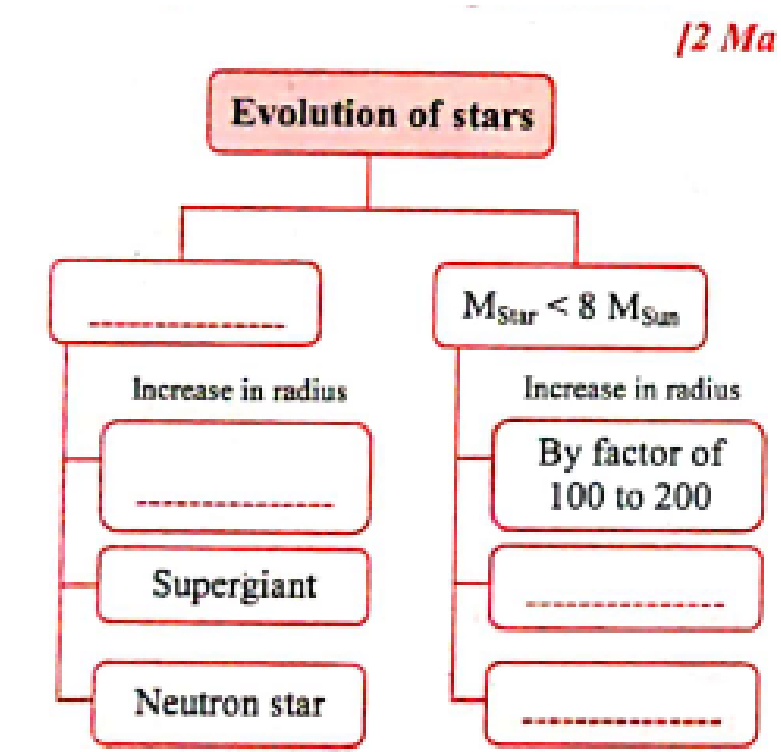
81. Complete the following flowchart :



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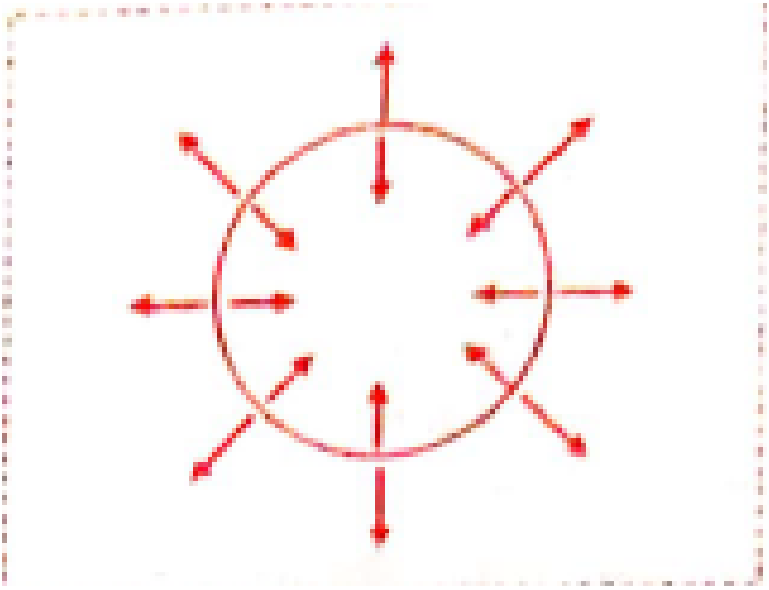
82. Questions based on diagram :

The figure below shows forces acting on a star

:

What does an outward arrow indicate ?:



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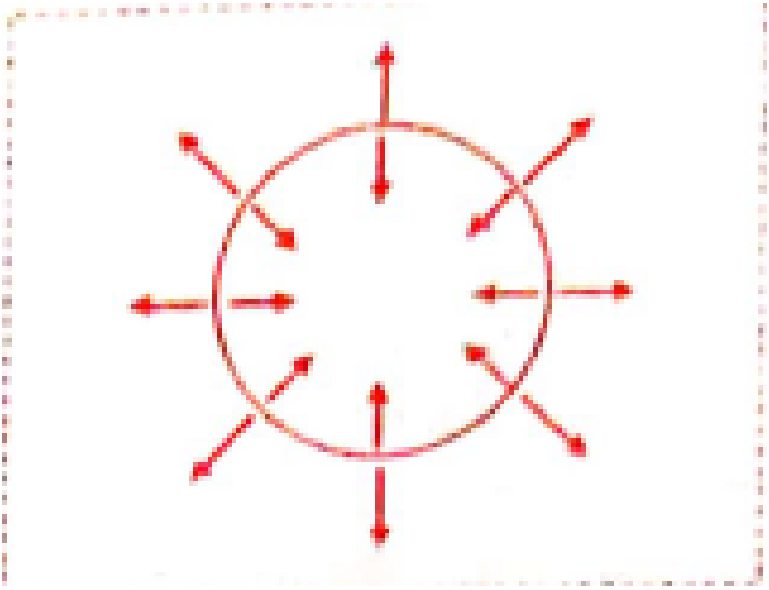
83. Questions based on diagram :

The figure below shows forces acting on a star

:

What does an inward arrow indicate ? :



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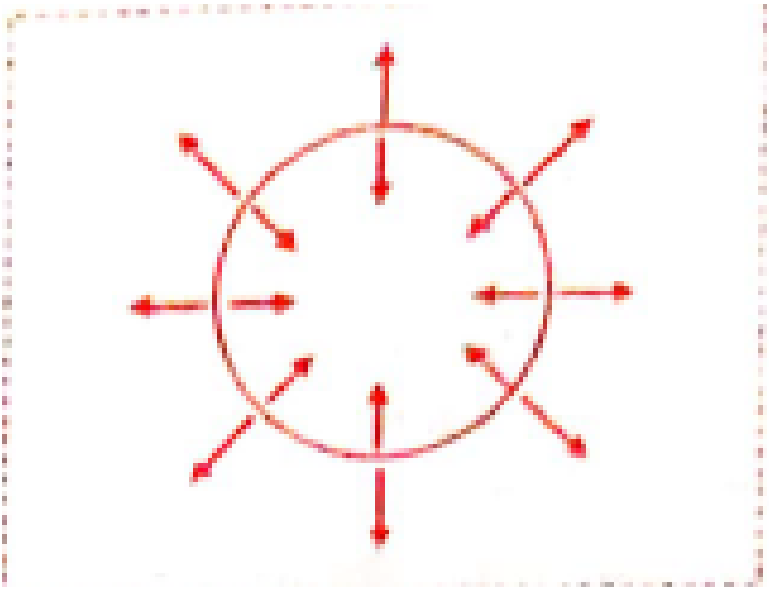
84. Questions based on diagram :

The figure below shows forces acting on a star :

What will happen if quantity represented by outward arrow is mor than quantity represented by inward arrow ?:



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85. Questions based on paragraph :

One way of classifying stars is on the basis of their temperature . In the order of decreasing temperature , stars are divided into seven main types viz , O ,B,A,F,G,K and M . :

What do you think will be a likely unit of average luminosity ? why ? :

Star Type	Colour	Approximate surface temperature	Approximate average mass	Approximate average radius	Approximate average luminosity (brightness)
O	Blue	> 25,000 K	60	15	1,400,000
B	Blue-white	11,000 – 25,000 K	18	7	20,000
A	White	7,500 – 11,000	3.2	2.5	80
F	Yellow-white	6,000 – 7500 K	1.7	1.3	6
G	Yellow	5,000 – 6,000 K	1.1	1.1	1.2
K	Orange	3,500 – 5000 K	0.8	0.9	0.4
M	Red	< 3,500 K	0.3	0.4	0.04

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86. Questions based on paragraph :

One way of classifying stars is on the basis of their temperature . In the order of decreasing temperature , stars are divided into seven main types viz , O ,B,A,F,G,K and M . :

Do you think , there is a possible dependence of brightness of star on its surface temperature ?:

Star Type	Colour	Approximate surface temperature	Approximate average mass	Approximate average radius	Approximate average luminosity (brightness)
O	Blue	> 25,000 K	60	15	1,400,000
B	Blue-white	11,000 – 25,000 K	18	7	20,000
A	White	7,500 – 11,000	3.2	2.5	80
F	Yellow-white	6,000 – 7500 K	1.7	1.3	6
G	Yellow	5,000 – 6,000 K	1.1	1.1	1.2
K	Orange	3,500 – 5000 K	0.8	0.9	0.4
M	Red	< 3,500 K	0.3	0.4	0.04

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87. Questions based on paragraph :

One way of classifying stars is on the basis of their temperature . In the order of decreasing temperature , stars are divided into seven main types viz , O ,B,A,F,G,K and M . :

Which star type would our sun belong ?:

Star Type	Colour	Approximate surface temperature	Approximate average mass	Approximate average radius	Approximate average luminosity (brightness)
O	Blue	> 25,000 K	60	15	1,400,000
B	Blue-white	11,000 – 25,000 K	18	7	20,000
A	White	7,500 – 11,000	3.2	2.5	80
F	Yellow-white	6,000 – 7500 K	1.7	1.3	6
G	Yellow	5,000 – 6,000 K	1.1	1.1	1.2
K	Orange	3,500 – 5000 K	0.8	0.9	0.4
M	Red	< 3,500 K	0.3	0.4	0.04

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88. Questions based on paragraph :

One way of classifying stars is on the basis of their temperature . In the order of decreasing temperature , stars are divided into seven main types viz , O ,B,A,F,G,K and M . :

Arrange stars types in the increasing order of temperatures at the centre of stars .:

Star Type	Colour	Approximate surface temperature	Approximate average mass	Approximate average radius	Approximate average luminosity (brightness)
O	Blue	> 25,000 K	60	15	1,400,000
B	Blue-white	11,000 – 25,000 K	18	7	20,000
A	White	7,500 – 11,000	3.2	2.5	80
F	Yellow-white	6,000 – 7500 K	1.7	1.3	6
G	Yellow	5,000 – 6,000 K	1.1	1.1	1.2
K	Orange	3,500 – 5000 K	0.8	0.9	0.4
M	Red	< 3,500 K	0.3	0.4	0.04

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89. Answer in one sentence :

What is galaxy ?

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90. What are the different constituents of our solar system ?

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91. What are the major differences between a star and a planet ?

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92. What is a satellite ?

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93. Which is the star nearest to us ?

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94. What is meant by balanced and unbalanced forces ?

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95. Given below are the steps in the life cycle of a massive star . Using the information about life cycle of stars , arrange the steps in the correct order of their occurrence :

a red giant forms when the stars hydrogen level drops

if it is a massive star , a neutron star is formed . if it is super massive star , a black hole is formed

a main sequence star that can live for millions or even billions of years gets formed

gravity pulls hydrogen gas together to form a cloud

a supernova occurs

nuclear fusion occurs causing the star to glow .

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96. Write the effects : If the sun disappears .....

97. Answer the following :

Name the following :

Huge clouds of gas and dust present in the empty spaces between stars in a galaxy .

98. Answer the following questions :

Fill in the blanks :

The properties of the sun will change slowly in future after another .....

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99. Answer the following questions :

State right anf wrong . If wrong , write the correct sentence :

In the sun , energy is generated by fission of helium nuclei to form hydrogen nuclei .

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100. Answer the following questions :

Complete the given analogy :

M_star < 8M_sun : white dwarf :: M_star < 25M_sun : .....

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101. Answer the following questions :

Find odd one out :

Spiral galaxy , conical galaxy , elliptical galaxy , irregular galaxy .

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102. Choose the correct alternative :

Ratio of hydrogen to helium gas present in the sun is .....

A. 1.5090277777778

B. 2.9347222222222

C. 3.0166666666667

D. 0.042361111111111

Answer:

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103. Choose the correct alternative :

When a star contracts , ...

A. its mass decreases

B. its mass increases

C. its temprature decreases

D. ita temperature increases

Answer:

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104. Choose the correct alternative :

The nd stage of a star is always .....

A. black hole

B. stable

C. unstable

D. an explosion

Answer:

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105. Answer the following :

Distinguish between neutron star and black hole .

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106. Answer the following :

Explain how stars are born .

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107. Answer the following :

State any four properties of the sun .

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