**PROBLEMS**

**INDONESIAN ASTRONOMY OLYMPIAD 2011**

**Level: Regency**

**MULTIPLE CHOICE**

1. A planetary nebula is ….
2. planets orbiting a star
3. gas that will collapse to form planets
4. giant molecular cloud which is currently forming new stars
5. very dense gas cloud consist of organic molecule
6. ejected gas from a star which will become a white dwarf
7. Brown dwarf is ….
8. small brown-reddish planet like Mars
9. hydrogen and helium gas which has insufficient mass to start nuclear reaction in its core
10. giant planet like Jupiter and Saturn
11. stars which its mass is between white dwarf and black hole
12. white dwarf in cooling process
13. Horizontal branch stars get its energy from … in its core.
14. carbon fusion
15. hydrogen fusion
16. helium fusion
17. b and c
18. a and c
19. Which statement best describes reaction process in the Sun core?
20. hydrogen and helium reaction to form carbon
21. reaction of three hydrogen atoms to form two helium atoms
22. helium and carbon reaction to form hydrogen
23. hydrogen and carbon reaction to form helium
24. none of them
25. Which statement is correct?
26. All white dwarf is neutron star.
27. All pulsar is neutron star.
28. All neutron is pulsar.
29. All black hole is pulsar.
30. Neutron star has nothing to do with pulsar.
31. A white dwarf holds gravitational force by….
32. rotating very rapidly
33. exploding
34. fusing heavy elements to form iron
35. degenerated matter pressure
36. radiating energy to the space
37. In a clear day, an observer in Pontianak (under the equator) is unable to see his own shadow. An object called Tugu Khatulistiwa has height of . How long would this object shadow be at ? (Neglecting atmospheric refraction)
38. There would be no shadow
39. Which statement is correct?
40. In south pole, in December, Sun will be shortest above the horizon.
41. In north pole, in 23rd of December, maximum elevation of the Sun from the horizon is .
42. In equator, in 21st of March and 23rd of September, duration of the day will be the same as night duration.
43. In equator, in 21st of March, duration of the day will be the same as night duration.
44. We will be able to observe Alpha Centaury in the north pole.
45. If we live near the equator, taking picture of stars in non-tracking mode for 12 minutes will result image of … length.
46. Declination of Alpha Centaury, the second brightest star is . The northest latitude where an observer can still see this star is ….
47. If the earth reverses its rotation direction, siderial day will be ….
48. 24h04m
49. 24h00m
50. 23h56m
51. 23h52m
52. 23h48m
53. There are only a few on the Earth who have ever seen Total Solar Eclipse, rather than Total Lunar Eclipse. It is because ….
54. Total Solar Eclipse occured in daytime, Total Lunar Eclipse occured at night.
55. Total Solar Eclipse covers narrow region on Earth surface, Total Lunar Eclipse covers all of Earth surface.
56. Total Solar Eclipse occurred in several minutes, Total Lunar Eclipse occurred in several hours.
57. Total Solar Eclipse always occurred in equator, Total Lunar Eclipse occurred in all latitude.
58. Total Solar Eclipse causes total dark sky, Total Lunar Eclipse doesn’t.
59. An astronout sitting on the Moon see the Earth in full phase. So, the Moon is in … phase that time.
60. fullmoon
61. newmoon
62. first quarter
63. last quarter
64. first gibbous
65. If the Moon and the Earth rotate perfectly sinchronous, means that the Moon will always be above a fixed place on Earth, Moon period will be ….
66. 30 days
67. 28 days
68. 14 days
69. 7 days
70. 1 days
71. Which statement is correct?
72. Two colors diagram (U-B) vs (B-V) is a plot of various spectral classes, which suffer from reddening and which doesn’t.
73. Two colors diagram (U-B) vs (B-V) is a plot of various spectral classes, which doesn’t suffer from reddening.
74. Two colors diagram (U-B) vs (B-V) is commonly used to estimate reddening of a star, but it can not be used to determine its spectral class.
75. Stars with (B-V) = +2.0 are bluer than stars with (B-V) = +1.0
76. Stars with B = 7.0 are hotter than stars with B = 9.0.
77. Which statement is correct?
78. Spectral classes show stars temperature, but it does not show stars colors.
79. Two colors diagram is a diagram showing relation of magnitude in blue and red wavelength.
80. Hertzsprung-Russel diagram shows energy which is radiated by a star and its temperature.
81. In Hertzsprung-Russel diagram, luminosity of M stars is always higher than G stars.
82. In Hertzsprung-Russel diagram, luminosity of A stars is always lower than G stars.
83. Which statement is not correct?
84. O class stars spectrum shows strong continuum of ultraviolet and once ionized helium line.
85. Strong Balmer hydrogen line appears in A spectral class stars.
86. Metal line appears in F spectral class stars.
87. M stars show molecular bands spectrum.
88. It is possible to see ionized helium line and titanium oxyde band in a star spectrum.
89. Which statement is not correct?
90. Emission line which appears in a spectrum shows that the star is surrounded by gas.
91. Wolf-Rayet stars are O class stars which have wide emission line.
92. Wide emission line in a spectrum shows that gas surrounding a star is moving in high speed.
93. HII region (ionized hydrogen) gives emission spectrum.
94. Electron jumping from lower to higher energy level causes emission line.
95. Which statement is NOT correct
96. If the Sun is displaced 100 times away from its current position, its brightness will drop 10,000 times.
97. If Alpha Centaury is displaced 1/10 times from its current position, it will appear 100 brighter.
98. Stars with m = 2 mag is as bright as 2 times of stars with m = 1 mag
99. Apparent magnitude is defined as stars brightness which we see.
100. Absolute magnitude is defined as stars brightness as they are placed 10 pc away from us.
101. Which statement is not correct?
102. H-R Diagram (Hertzsprung-Russel) shows relation of age and stars temperature.
103. H-R Diagram shows relation of luminosity and stars temperature.
104. Stars temperature in H-R diagram can be replaced by spectral class or stars color.
105. In H-R Diagram, about 90% of the stars are distributed in a band which is commonly called main sequence.
106. An AIII star has smaller absolute magnitude than AV stars.
107. Planet X radii is R1, its parent star radii is R2. If X is 2 AU away from the star and R1 = 0.2R2, umbra length of the corresponding planet is ….
108. Two main elements of Solar System nebula are ….
109. hydrogen and helium
110. hydrogen and nitrogen
111. oxygen and lithium
112. carbon and hydrogen
113. helium and lithium
114. Interstellar matter consists of gas and dust. However, dusts play more significant role in dimming star light. This is because ….
115. the number of dusts are much more than the number of gas
116. the number of dusts are similar as the number of gas
117. dusts size is the same as gas size
118. dusts size is the same as visual wavelength
119. dusts temperature is cooler than gas temperature
120. Which one is correct?
121. Blue, young stars are located in Galactic spiral arms.
122. Young, hot stars are located in Galactic halo.
123. Open clusters are located in Galactic halo.
124. Sun is the center of Galaxy.
125. All stars in Galaxy were born together.
126. Which one is correct?
127. Galactic nucleus, galactic bulge, galactic disk, and halo are main components of spiral galaxies.
128. Globular clusters age is usually younger than galactic clusters.
129. Pop I stars consist of old stars
130. Pop II stars consist of young stars in galactic disk
131. Pop II stars contain more heavy abundance than Pop I stars
132. Which one belongs to Big Bang evidence?
133. Cosmic microwave background from all over the sky
134. Average temperature of the universe is 2.7 K
135. Light element abundance which fits the prediction
136. All of the above are correct
137. All of the above are not correct
138. Which one is not correct?
139. Chromatic aberation occurred because different wavelength is focused in different focal point.
140. Chromatic aberation causes blue wavelength has longer focus than red wavelength.
141. Chromatic aberation will not be found in reflector telescope.
142. Spherical aberation occurred because reflector surface does not reflect light to a single focal point.
143. Spherical aberation will not be found in refractor telescope.
144. A telescope magnification ….
145. depends on lens diameter
146. depends on focal length of objective lens
147. depends on focal length of eyepiece and objective lens
148. depends on focal length of eyepiece
149. none of the above
150. A sunspot temperature is 4,500 K. Hence, the highest energy radiated by this object is in ….
151. 6,422 Angstrom
152. 5,622 Angstrom
153. 3,642 Angstrom
154. 4,262 Angstrom
155. 7,644 Angstrom
156. Astronomer is observing stars in a clear night. Later, cloud is eventually coming and covering his sky. At 9 pm, ½ of the sky is covered by the cloud. At 10 pm, cloud covers 1/3 part of the sky wich hasn’t been covered yet before. At 11 pm, it happens again for ¼ of the sky which hasn’t been covered yet an hour before. At 00 am, cloud covers 1/5 more of the sky (which also hasn’t been covered yet at 11 pm). Calculate part of the sky, where the astronomer can still observe the stars!
157. 1/5
158. 1/6
159. 1/8
160. 1/10
161. 1/12