REACH FOR THE STARS

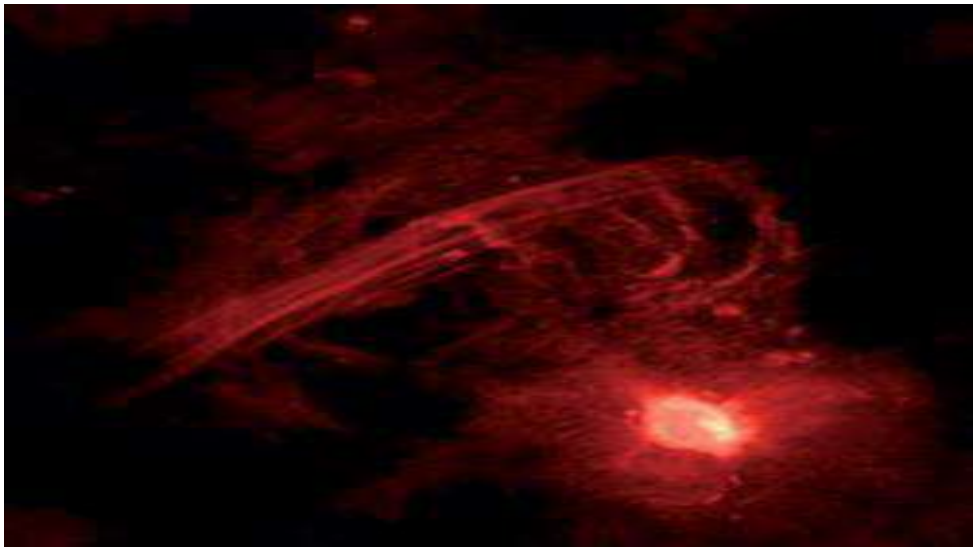
Please fill in the following accurately:

School name:
Team color:
Team number:

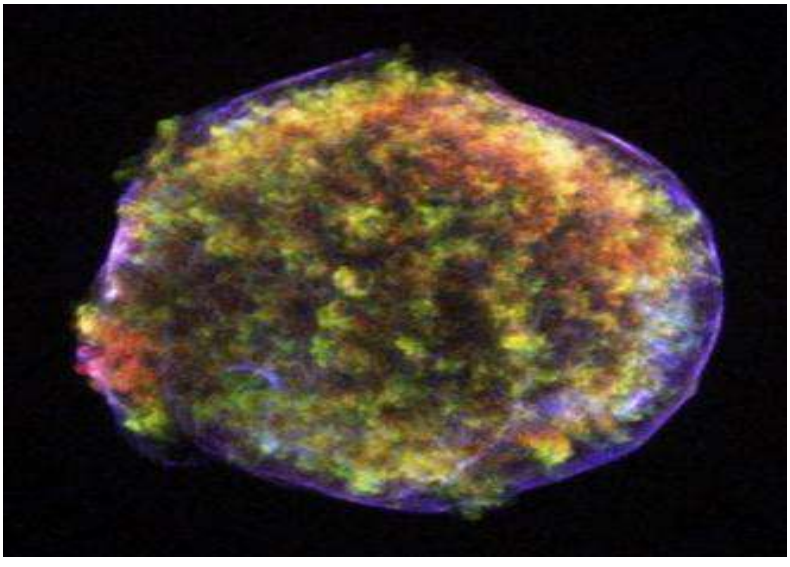
Part 1 (Total 50 pts)

For each of the following images, give the following information: (Total points : 32)
i. The name of the deep-space object.
ii. The portion of the electromagnetic spectrum used to take the image. (gamma ray, x-ray, etc.)
iii. The approximate distance from earth, in light years.
iv. The constellation in which the object can be found

1. 

2. 

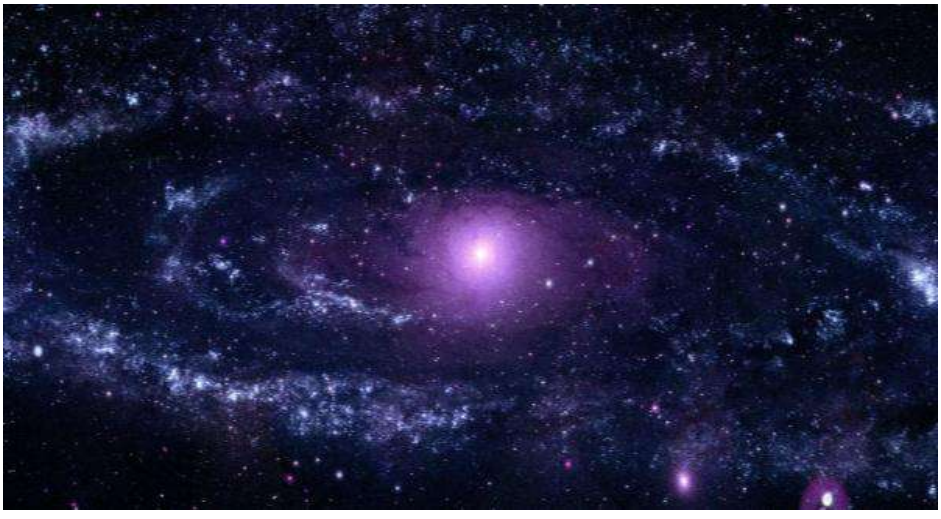
3. 

4. 

5. 

6. 

7. 

8. 

9. Refer to the following star chart for all questions in this section. (10 points total; 1 pt each question)

Constellations:

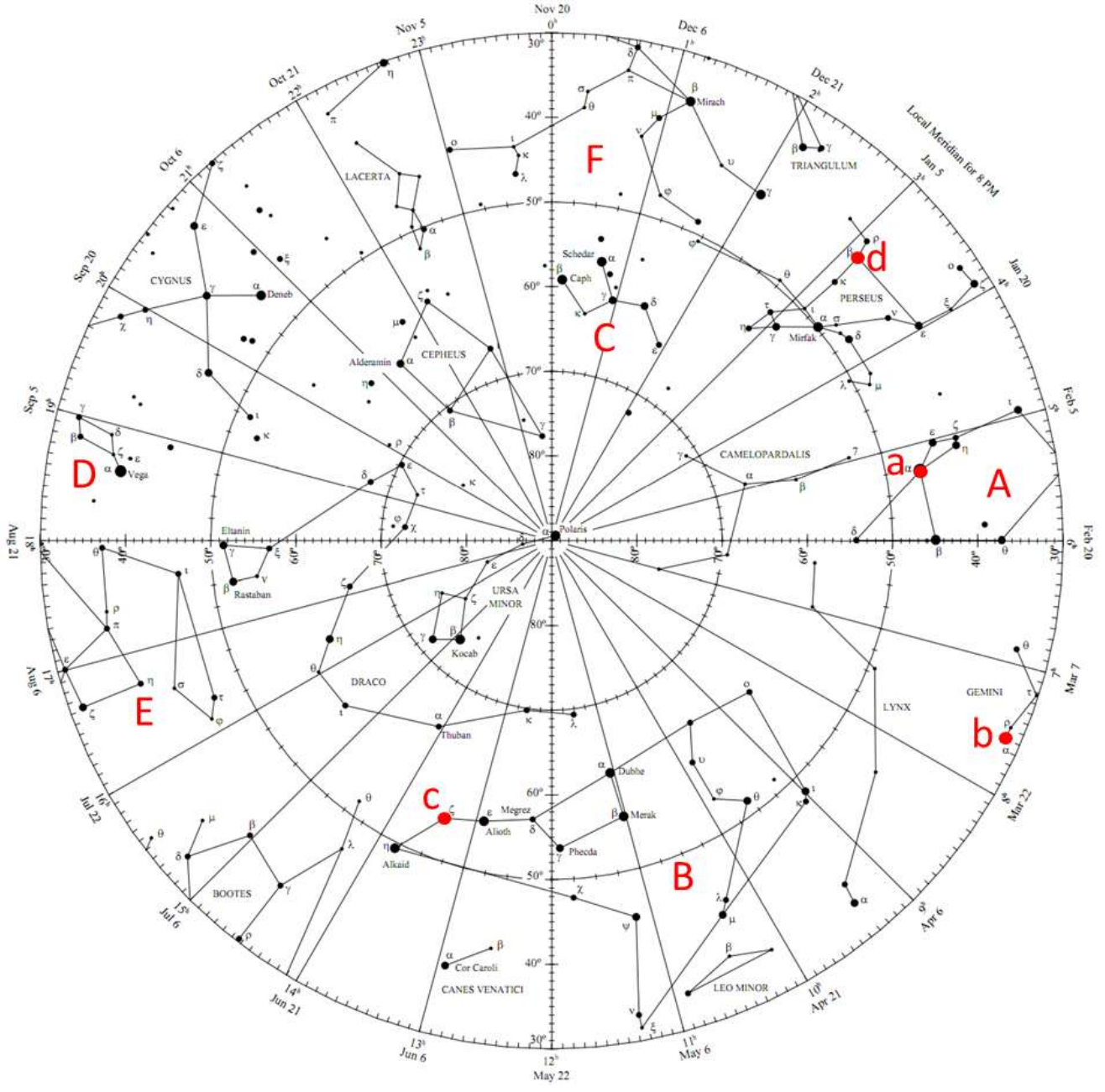
Give constellation names. Refer to the red capital letters in the star chart.

A	
B	
C	
D	
E	
F	

Stars:

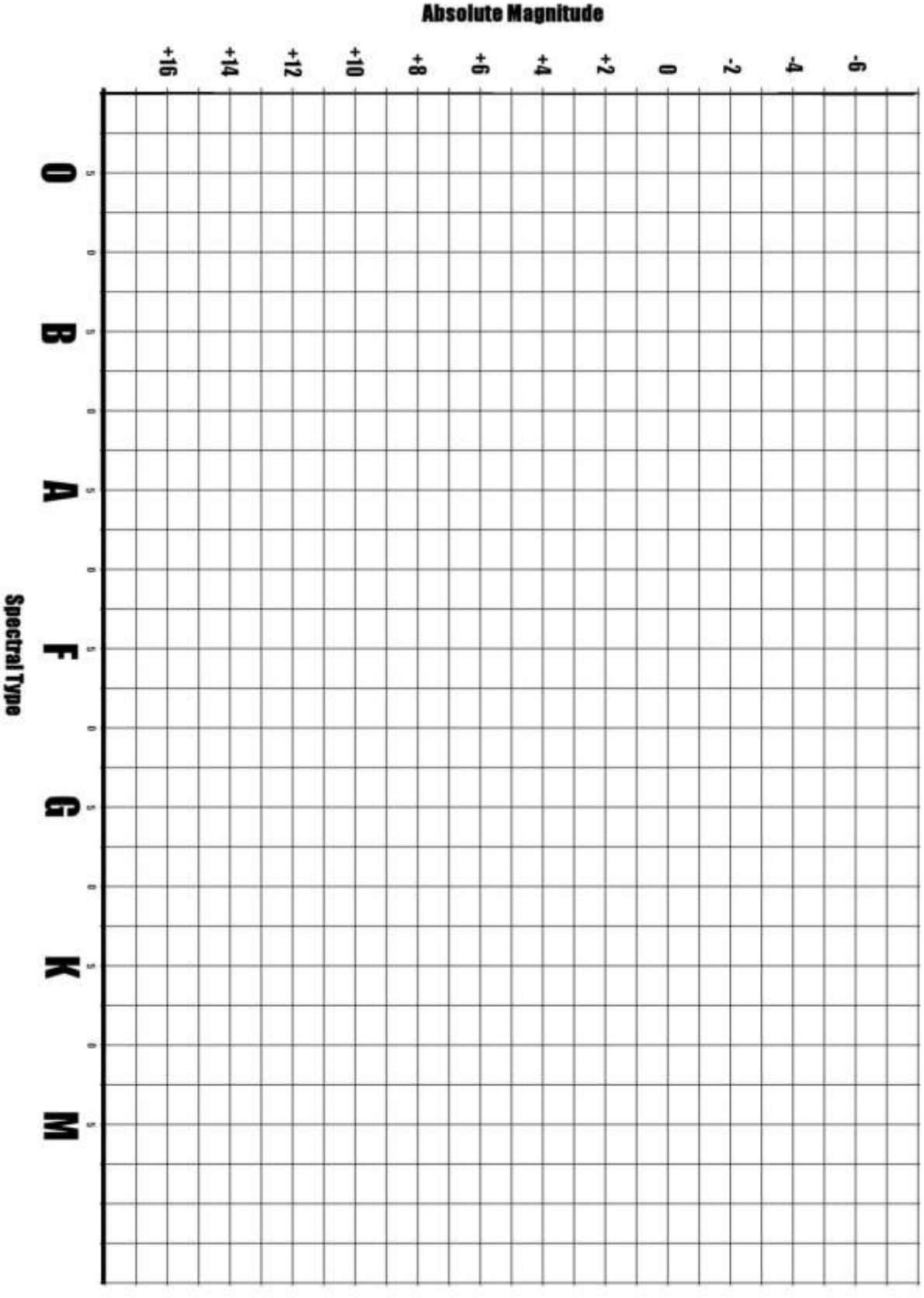
Give star names. Refer to the stars marked as red circles labeled with lowercase letters on the star chart

a	
b	
c	
d	


Nov 20
Dec 6
Dec 21
Jan 5
Jan 20
Feb 5
Feb 20
Mar 7
Mar 22
Apr 6
Apr 21
May 6
May 22
Jun 6
Jun 21
Jul 6
Jul 22
Aug 6
Aug 21
Sep 5
Sep 20
Oct 6
Oct 21
Nov 5
Local Meridian for 8 PM
Mirach
TRIANGULUM
LACERTA
Schedar
Caph
PERSEUS
Mirfak
CYGNUS
Deneb
Alderamin
CEPHEUS
CAMELOPARDALIS
Vega
Eltanin
Rastaban
Polaris
URSA MINOR
Kocab
DRACO
Thuban
LYNX
GEMINI
Dubhe
Merak
Megrez
Alioth
Phecda
Alkaid
BOOTES
Cor Caroli
CANES VENATICI
LEO MINOR
A
B
C
D
E
F
a
b
c
d

9. **Evolutionary stage (Total 8 pts)**
   Name the evolutionary stage for each star. Then, there is a blank H-R diagram on the next page. Plot the stars given on the chart. Clearly label each star. (1 point each to a total of 4 pts for first part of question; plotting of stars on HR is additional 1 pt each to a maximum of 4 pts)

Star	**Absolute Magnitude**	**Spectral Type**	**Evolutionary Stage**
Spica	-3.55 MV	B1	
Aldebaran	-0.63 MV	K5	
Deneb	-7.0 MV	A2	
Proxima Centauri	15.49 MV	M5.5	


Absolute Magnitude
+16
+14
+12
+10
+8
+6
+4
+2
0
-2
-4
-6
Spectral Type
O
B
A
F
G
K
M

Part I

Part II (total pts: 50 pts)

1. What is the Sun's spectral class? (1 pt) _____
2. What is the Sun's absolute magnitude? (1 pt) _____
3. At what distance are apparent and absolute magnitude the same? (1 pt) _____
4. What do the H and R stand for in "H-R diagram"? (2 pts) _____

   _____
5. What does the H_R diagram plot? (2 pt)

   _____
6. Antares emits a large portion of its energy in what non-visible wavelength? (1 pt)

   _____
7. White dwarfs can go supernova when they approach a certain mass. What is the name of this "critical mass"? (1 pt) _____
8. What type of supernova results from a white dwarf gaining too much mass and exploding? (1 pt)

   _____
9. Vega, Altair, and Regulus are flattened at the poles and bulging at the equator. What are the reasons for this ? (2 pts) _____
10. Which star, excluding the sun, is the closest to Earth? How far is it (to .1 light years)? (2 pts)

    _____
11. What is the term for stars that don't have enough mass to start nuclear fusion? (1 pt)

    _____
12. What are the evolutionary stages of a Sun-sized star? (4 pts)
    a. _____
    b. _____
    c. Red giant

d. _____

e. _____

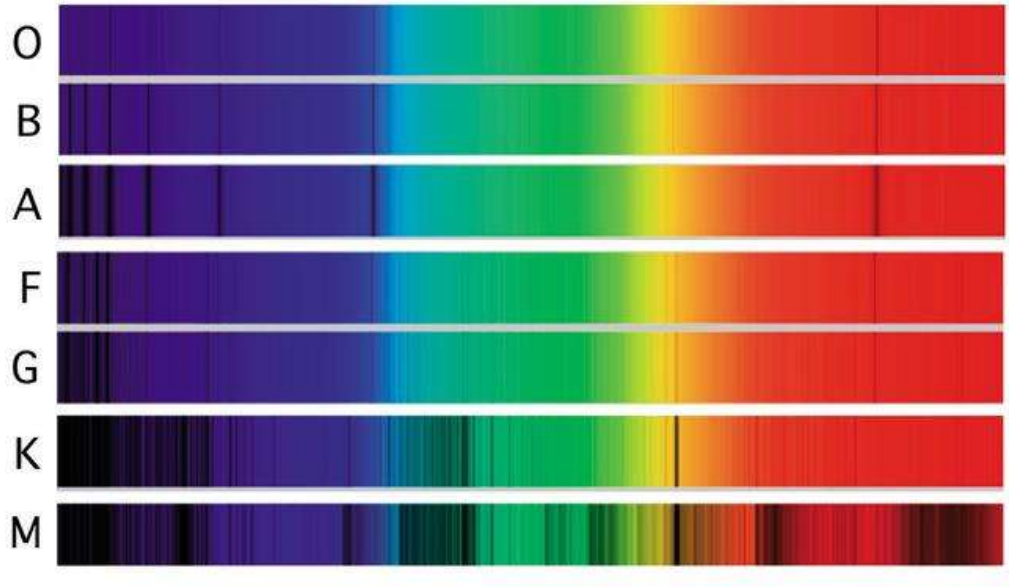
13. For the sake of convenience, astronomers have divided the sky into 88 constellations. In which of these does the current Polar star, Polaris, lie? (1pt)

_____

14. What is the general relationship between the mass of a star and its lifespan? (1 pt)

_____

_____



The following questions refer to the spectral sequence shown above. For questions 15 to 19 below, list the spectral type which is best described by the statement. (1 pt for each)

15. The sun is this spectral class. _____

16. This spectral class contains the hottest stars. _____

17. This spectral class contains the coolest stars. _____

18. Stars in this spectral class emit most of their energy in the ultraviolet_____

19. Stars in this spectral class emit most of their energy in the infrared
_____

20. Which star is the brightest in the nighttime sky? (1 pt)
_____

21. Stars in clusters are bound together by what? (1 pt)
_____

22. What is Keppler's third law? (1 pt)
_____

23. What are the stellar luminosity classes? (5 pts)
_____
_____
_____
_____
_____

24. What are the 3 types of binary star systems? (3 pts)
_____
_____
_____

25. What are the two most important properties of a telescope and explain each term. (4 pts)
_____
_____
_____
_____

26. What is luminosity? (1 pt)

_____

27. What are the 3 main types of galaxies? (3 pts)

_____
_____
_____

28. What is pulsar and what is it composed of ? (2 pts)

_____
_____

29. What is the difference between absolute and apparent magnitude (1pt)

_____
_____

30. Explain following terms (2 pts)
    a. Astronomical unit
    b. Light year

_____
_____