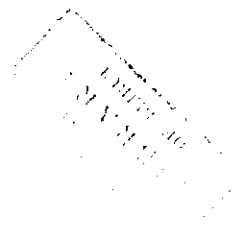


Fall



### Geology 102 Final Exam 1999-2000

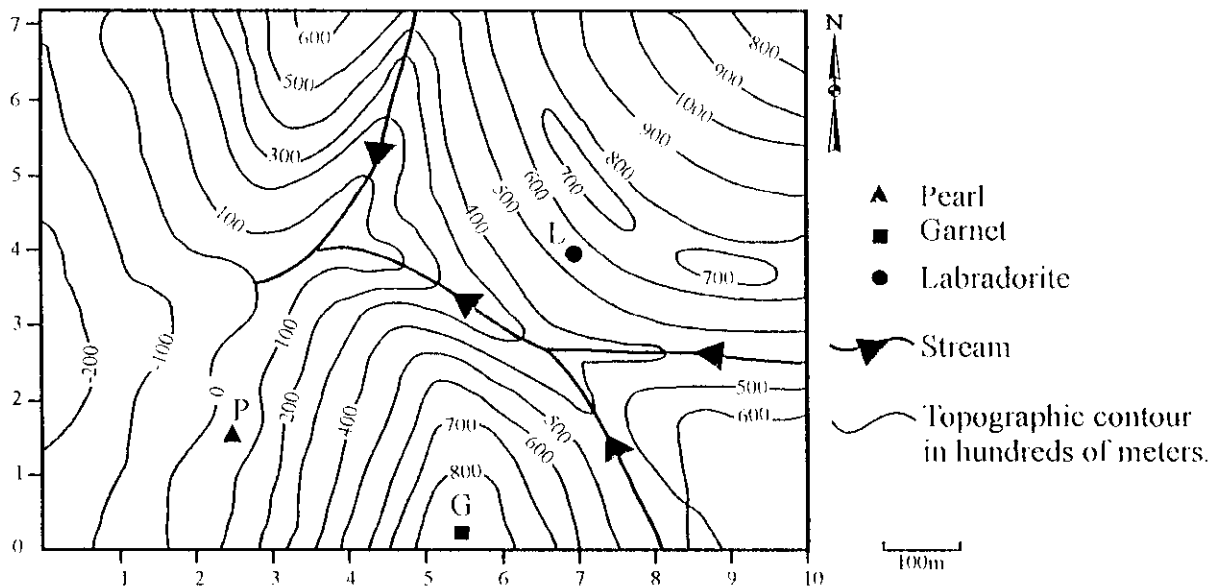
Exam rules apply  
Time allowed: Two hours

#### Section A:

Note that two marks will be given for a correct answer and a half mark will be deducted for each incorrect answer. If more than one answer is given a half mark will be deducted. Please answer the questions on the answer sheet provided.

- 1) Which of the following statements is not true?
  - a) Eurasia is the largest continent
  - b) Australia is the smallest continent
  - c) Continental North America is bigger than continental South America
  - d) The Pacific Ocean is bigger than the Atlantic Ocean
  - e) The Black Sea is bigger than the Mediterranean Sea
  
- 2) On a map, if a second is equivalent to 0.03083km then what is a degree equivalent to?
  - a) 1.85km
  - b) 18.5km
  - c) 52km
  - d) 111km
  - e) None of the above
  
- 3) On which of the following maps will the size of Africa be clearly represented?
  - a) Mercator
  - b) Gnostic
  - c) Conic
  - d) Planar
  - e) Equal area

Figure 1



Study figure 1 carefully before answering questions 4-6.

- 4) Which of the following statements about figure 1 is true?
- a) There were two errors made whilst constructing the topographic contours.
  - b) There were six errors made whilst constructing the topographic contours.
  - c) The grid reference for the towns of Pearl and Garnet are (1.5, 2.5) and (5.5, 0.3) respectively.
  - d) The town of Labradorite is situated on the western side of a river valley
  - e) The sea lies to the west of the town of Pearl
- 5) If the temperature at Pearl is 15°C and the temperature at Labradorite is 13.5°C then what is the DALR ?
- a) 0.1°C/100m
  - b) 0.3°C/100m
  - c) 0.5°C/100m
  - d) 0.75°C/100m
  - e) 1.25°C/100m
- 6) If the temperature at Pearl is 12°C, the DALR is 1.5°C/100m, the SALR is 0.5°C/100m and Dew point is at 7.5°C then which of the following statements is not true?
- a) Clouds will start to form at a height of 350m above sea level
  - b) Rain will start to fall when the clouds reach a height of 500m above sea level
  - c) The temperature in Labradorite will be 6.5°C
  - d) The temperature in Garnet will be approximately 5°C
  - e) The towns of Garnet and Labradorite are likely to be foggy.
- 7) An astronaut has been sent on a mission to another planet 227.04 trillion kilometres away. How long would it take him to get there if he could travel at half the speed of light?
- a) 12 years
  - b) 24 years
  - c) 48 years
  - d) 60 years
  - e) None of the above
- 8) Which of the following statements is not true.
- a) The Earth spins on its own axis every 23 hours and 56 minutes.
  - b) The Earth is closer to the sun in January than it is in July
  - c) The Earth has an average surface temperature of approximately 15°C
  - d) The Earth has a radius of 12,756km
  - e) The atmosphere of the Earth is composed primarily of Nitrogen and Oxygen.

- 9) Which of the following statements is true?
- On December 22<sup>nd</sup> in the Northern Hemisphere the sun's rays hit the Tropic of Cancer at 90°
  - On September 23<sup>rd</sup> in the Northern Hemisphere the sun's rays hit the equator at 90°.
  - On March 21<sup>st</sup> in the Northern Hemisphere the sun's rays hit the North pole at 90°
  - On June 22<sup>nd</sup> in the Northern Hemisphere the sun's rays hit the Tropic of Capricorn at 90°.
  - None of the above

Table 1

Family	Departing	Time of Dep.	Arriving	Time of Arr.	Speed of plane
Red	Norway (15E)		USA (75W)		1.5 hours/15 deg.
Yellow	Iceland (30W)		S. Africa (30E)		1 hour/15 deg.
Blue	Portugal (0)		Peru (60W)		2 hours/15 deg.
Brown	Greenland (45W)	12:00 Jan 11	Portugal (0)		0.5 hours/15 deg.

Examine Table 1 carefully before answering questions 10-12.

10) The Blue team departs from Portugal at the same time that the Brown team arrives. At what time will the Blue team arrive in Peru?

- 15:00 hours on January 11<sup>th</sup>
- 16:30 hours on January 11<sup>th</sup>
- 20:30 hours on January 11<sup>th</sup>
- 04:30 hours on January 11<sup>th</sup>
- None of the above

11) The Yellow team leaves Iceland when the Blue team is at the same longitude, (i.e. 30°W). What time do the Yellow team arrive in S. Africa?

- 18:30 hours on January 11<sup>th</sup>
- 22:30 hours on January 11<sup>th</sup>
- 02:30 hours on January 11<sup>th</sup>
- 04:30 hours on January 11<sup>th</sup>
- None of the above

12) If the Red team and the Yellow team cross at 0° then what were the departure and arrival times of the Red team?

- 22:00 hours on January 11<sup>th</sup> and 23.30 hours on January 11<sup>th</sup>
- 23:30 hours on January 11<sup>th</sup> and 01:00 hours on January 11<sup>th</sup>
- 22:00 hours on January 11<sup>th</sup> and 01:00 hours on January 12<sup>th</sup>
- 22:30 hours on January 11<sup>th</sup> and 23:30 hours on January 11<sup>th</sup>
- None of the above

- 13) Which of the following divisions are completely within the Homosphere?
- Troposphere and Stratosphere
  - Mesosphere
  - Thermosphere
  - A and B are both correct
  - A, B and C are correct.
- 14) Which of the following statements is not true?
- Ozone is an oxygen molecule composed of three atoms of oxygen
  - The ozone layer is located in the stratosphere
  - Ozone is formed at ground level from the interaction of sunlight with car exhaust fumes.
  - Ozone is a constant gas
  - Ozone is broken down by CFC's
- 15) Three metal plates are heated in the laboratory such that plate 1 has a temperature of  $50^{\circ}\text{C}$ , plate 2 has a temperature of  $323^{\circ}\text{K}$  and plate 3 has a temperature of  $250^{\circ}\text{C}$ . Use this information to determine which of the following statements is true?
- The plate that emits the longest wave radiation is plate 1, both plates 2 and 3 emit radiation of a shorter wavelength.
  - Plate 2 emits radiation at the shortest wavelength of any of the three plates
  - Plate 3 emits radiation that has a wavelength that is longer than that of plate 2 but shorter than that of plate 1.
  - All of the above
  - None of the above.

Figure 2:

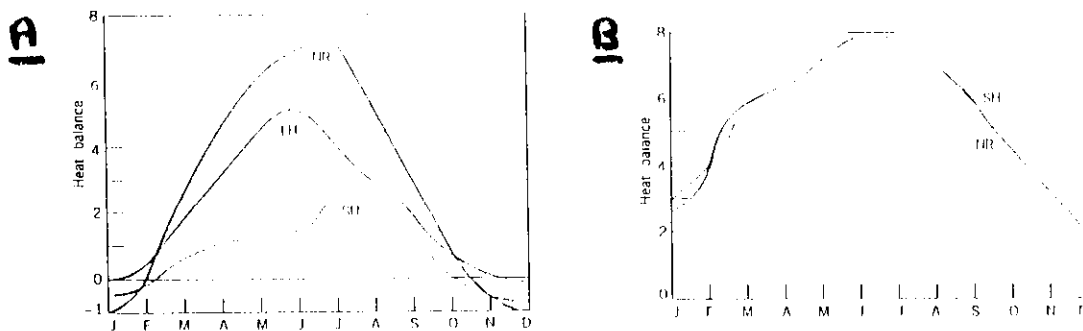


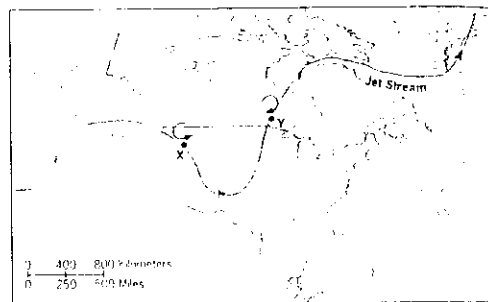
Figure 2 shows the heat balance for two localities. Study the diagrams carefully before answering question 16.

- 16) Which of the following statements is not true?
- The net radiation at locality A and B is seasonal
  - The sensible heat at locality B is high because there is no latent heat
  - The latent heat and the sensible heat are greater than the net radiation at certain times of year at locality A due to the input of ground heat
  - Statements A and B are both untrue
  - Statements A, B and C are untrue.

- 17) The horizontal transfer of heat via the wind is known as?
- a) Convection
  - b) Radiation
  - c) Gliding
  - d) Advection
  - e) Conduction
- 18) If air in the Southern Hemisphere is initially moving towards the west, what direction will it subsequently be deflected towards by the Coriolis force?
- a) West
  - b) Northwest
  - c) Southwest
  - d) South
  - e) North
- 19) Which of the following statements about local winds is not true?
- a) Katabatic winds involve cold air drainage
  - b) The Santa Ana and Chinook winds are closely associated with orographic precipitation
  - c) In coastal areas during the daytime there may be a land breeze
  - d) The land/sea breeze system results from the inequality between land and sea in absorbing solar radiation
  - e) In the mountains the winds blow up the valley during the daytime
- 20) Large cell-like circulation's of ocean currents are known as:
- a) Cyclones
  - b) Anticyclones
  - c) Drifts
  - d) Gyres
  - e) Eddies
- 21) The relative humidity, specific humidity and mixing ratio are measured using a:
- a) Thermometer
  - b) Psychrometer
  - c) Barometer
  - d) Hygrometer
  - e) Anemometer
- 22) The heat involved in melting is called:
- a) Sublimation
  - b) Evaporation
  - c) Latent heat of vaporization
  - d) Latent heat of fusion
  - e) Sensible heat

- 23) El Nino is caused by:
- a) The movement of warm waters along western coastal regions to replace zones of upwelling
  - b) The reversal of the atmospheric and oceanic circulation systems in the Pacific region
  - c) Global warming
  - d) A and B are both correct
  - e) A, B and C are correct.
- 24) At which stage in the life cycle of a thunderstorm does light surface rain fall?
- a) Developing stage
  - b) Mature stage
  - c) Dissipating stage
  - d) A and B are both correct
  - e) A, B and C are correct
- 25) A waterspout is best defined as:
- a) Sudden heavy rainfall
  - b) A type of hurricane
  - c) A type of freezing rain
  - d) A tornado that forms over a water surface
  - e) None of the above
- 26) An air mass developed over the continental Arctic that is warmer than the underlying surface and unstable would be designated:
- a) cPk
  - b) cPwu
  - c) cAks
  - d) cAAws
  - e) cAwu

Fig. 3



27) Figure 3 shows the location of the Polar Jet Stream over N. America. Which of the following statements with regard to localities X and Y is correct?

- a) X and Y are both regions of high pressure
- b) X and Y are both regions of low pressure
- c) X is an area of high pressure and Y is an area of low pressure
- d) X is an area of low pressure and Y is an area of high pressure
- e) None of the above

28) A man is camping in a field for a week. During this time he notices the following changes in the weather. At the beginning of the week the temperature is low, the pressure is falling and it is either foggy or raining with a light wind. A few days later the wind changes direction, the temperature increases and although it still rains it only rains in showers. This is followed by another change in wind direction, a rise in pressure, a decrease in temperature and heavy rain. What has the man observed during the week?

- a) The passage of a warm front
- b) The passage of a cold front
- c) The passage of an occluded front
- d) The passage of a cyclone in the open wave stage
- e) The passage of a cyclone in the occluded stage

29) In the Koppen classification scheme microthermal constantly moist climates are designated:

- a) Bs
- b) Cw
- c) Df
- d) Ef
- e) Dw

30) Which of the following is not a primary air pollutant?

- a) Carbon dioxide
- b) Sulfur dioxide
- c) Carbon monoxide
- d) Nitrogen dioxide
- e) Sulfuric acid

**Answer sheet:**

Name:.....

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
8	A	B	C	D	E
9	A	B	C	D	E
10	A	B	C	D	E
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E
14	A	B	C	D	E
15	A	B	C	D	E
16	A	B	C	D	E
17	A	B	C	D	E
18	A	B	C	D	E
19	A	B	C	D	E
20	A	B	C	D	E
21	A	B	C	D	E
22	A	B	C	D	E
23	A	B	C	D	E
24	A	B	C	D	E
25	A	B	C	D	E
26	A	B	C	D	E
27	A	B	C	D	E
28	A	B	C	D	E
29	A	B	C	D	E
30	A	B	C	D	E



**Section B (20 marks)**

Using fully labeled diagrams and, where possible examples, explain what is meant by the following: (Remember: No diagram = No grade).

1) Cloud classification

2) La Nina

3) Map projection

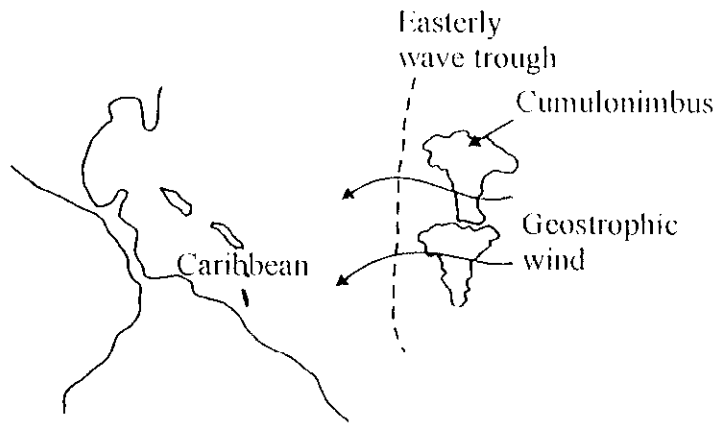
4) External processes responsible for climate change

5) Monsoon

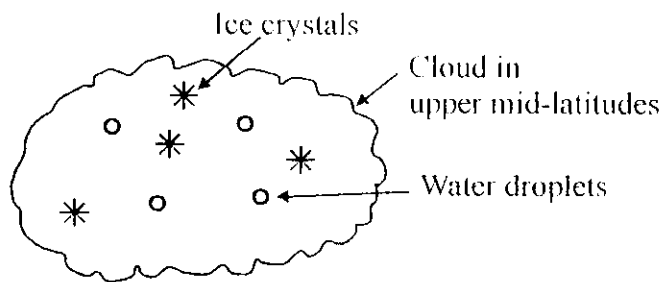
**Section C (20 marks)**

Using fully labeled diagrams and, where possible examples, show what happens next in each of the following cases. (Remember: No diagram = No grade).

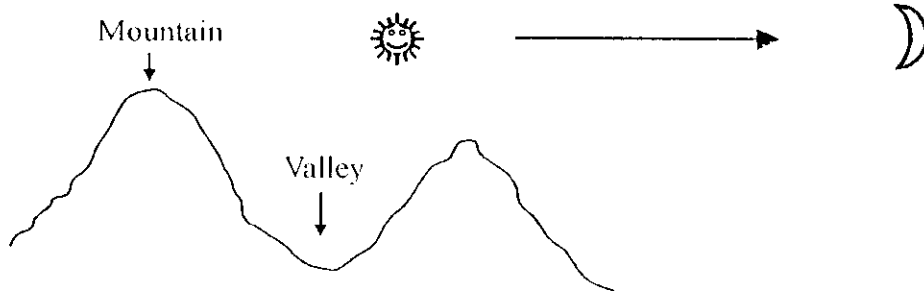
1)



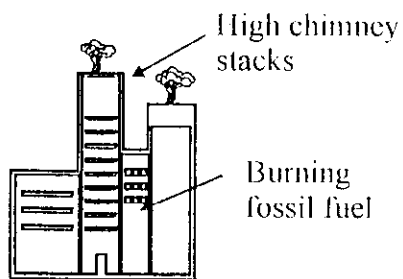
2)



3)



4)



5)

