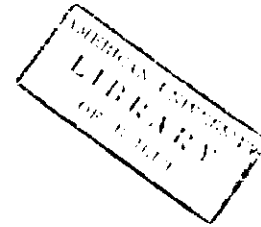


Name.....



Geology 207, Final Spring 98/99

Time allowed: 2 hours
Exam rules apply

Please answer the questions on the sheet provided. Note that four marks will be given for each correct answer and one mark will be deducted for each incorrect answer.

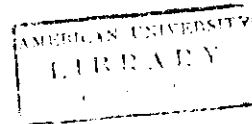
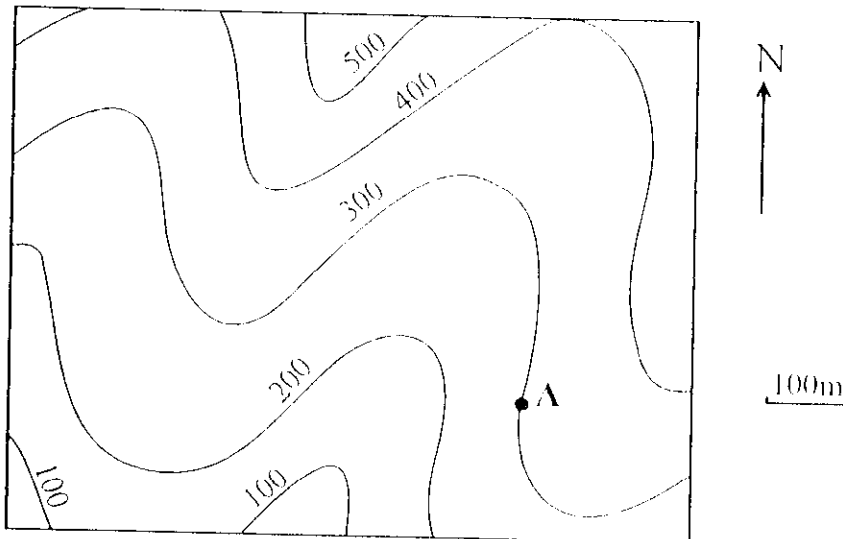
- (a) (b) (c) (d) (e)

- 1) The five map symbols (a-e) shown above represent. Horizontal joint
- a) a= Overturned strata, b = Minor fold, axis horizontal, c = Major or intermediate syncline, plunge in degrees, d = Regional dip of strata, e = Copper mineral vein.
 - b) a= Horizontal strata, b = Minor fold, with gentle plunge, c = Major or intermediate anticline, plunge in degrees, d = Younging direction, e = Base of lava flow
 - c) a= Horizontal strata, b = Minor fold, with steep plunge, c = Major or intermediate syncline, plunge in degrees, d = Regional dip of strata, e = Base of lava flow.
 - d) a= Horizontal joint, b = Minor fold, axis horizontal, c = Major or intermediate anticline, plunge in degrees, d = Younging direction, e = Copper mineral vein.
 - e) a= Horizontal cleavage, b = Minor fold, with gentle plunge, c = Major or intermediate anticline, plunge in degrees, d = Younging direction, e = Copper mineral vein.

- (a) 520Ma (b) 402Ma (c) 290Ma (d) 170Ma (e) 10Ma

- 2) The Radiometric dating ages (a-e) given above represent?
- a) a = Ordovician, b = Silurian, c = Carboniferous, d = Triassic, e = Tertiary
 - b) a = Ordovician, b = Devonian, c = Triassic, d = Jurassic, e = Tertiary
 - c) a = Silurian, b = Devonian, c = Triassic, d = Jurassic, e = Quaternary
 - d) a = Cambrian, b = Devonian, c = Carboniferous, d = Jurassic, e = Tertiary
 - e) a = Cambrian, b = Silurian, c = Permian, d = Triassic, e = Tertiary

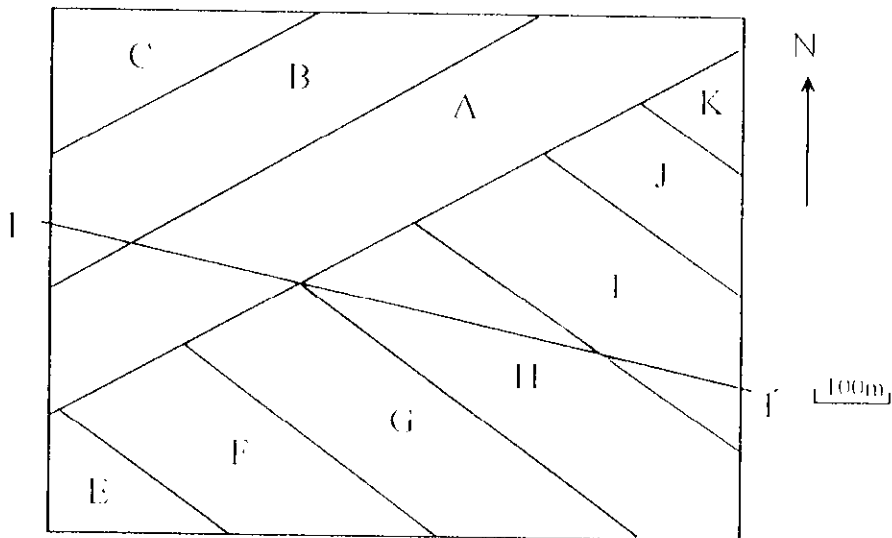
Figure 1:



Name.....

Figure 1 is a topographic map (100m contour interval) showing one position A where a thin coal seam was found at outcrop. Use this map to answer questions 3 and 4.

- 3) If the coal seam has a dip and strike of $070/26.57^\circ$ then the outcrop pattern of the coal would be best described as:
- a) A sinuous line trending approximately E-W
 - b) A sinuous line that runs across the map from NW to SE
 - c) A straight line that runs N-S
 - d) A relatively straight line that runs NNE-SSW
 - e) A straight line that runs E-W
- 4) If the coal seam has a dip and strike of $200/33.69^\circ$ then the outcrop pattern of the coal would be best described as:
- a) A sinuous line trending approximately E-W
 - b) A sinuous line that runs across the map from NW to SE
 - c) A straight line that runs N-S
 - d) A relatively straight line that runs NNE-SSW
 - e) A straight line that runs E-W



Name.....

Figure 2 is a map of flat terrain (elevation 300m above sea level). Ten rock units outcrop on the map. Units A-C dip to the NW at 30° . Units E-K dip 65° to the NE. Examine the map carefully before answering the following questions.

- 5) The apparent dip of the beds A-C along the line of cross-section 1-1' is?
 - a) 11.36°
 - b) 15.28°
 - c) 21.49°
 - d) 25.61°
 - e) 29.12°

- 6) The apparent dip of beds E-K in a N-S direction is?
 - a) 20°
 - b) 30°
 - c) 36°
 - d) 52°
 - e) 60°

- 7) The true thickness of bed B is?
 - a) 60m
 - b) 75m
 - c) 90m
 - d) 105m
 - e) 125m

- 8) The thickness of bed H in a vertical section would be?
 - a) 234.6m
 - b) 287.6m
 - c) 343.1m
 - d) 412.0m
 - e) 125m

- 9) The orientation of the intersection lineation between bed A and bed G is?
 - a) $29.8^\circ \rightarrow 140^\circ$
 - b) $30.5^\circ \rightarrow 323^\circ$
 - c) $12.6^\circ \rightarrow 160^\circ$
 - d) $13.4^\circ \rightarrow 340^\circ$
 - e) $25^\circ \rightarrow 198^\circ$

- 10) At what distance from 1 along the cross-section 1-1' and at what depth would we find the intersection between bed A and bed F?
 - a) 20m
 - b) 30m
 - c) 40m
 - d) 50m
 - e) 60m

Name

Figure 3 is a topographic map showing the location of 6 boreholes (A-F) and a fault line. Boreholes A-C lie to the SE of the fault and boreholes D-F to the NW of the fault. Examine the map and the accompanying table carefully before answering the following questions. (Note: the heights given in the borehole are relative to depth from the surface)

- 11) The outcrop pattern of the coal to the SE of the fault is best described as:
 - a) The coal does not outcrop
 - b) A straight line that trends N-S
 - c) An approximately 'U' shaped outcrop that 'Us' up the valley
 - d) An approximately 'U' shaped outcrop that 'Us' down the valley
 - e) A sinuous line that trends NE-SW

- 12) The outcrop pattern of the coal to the NW of the fault is best described as:
 - a) The coal does not outcrop
 - b) A straight line that trends N-S
 - c) An approximately 'U' shaped outcrop that 'Us' up the valley
 - d) An approximately 'U' shaped outcrop that 'Us' down the valley
 - e) A sinuous line that trends NE-SW

- 13) In the borehole marked Z on the map, the depth to the Top and Bottom of the coal relative to sea level would be:
 - a) T=0m, B=-200m
 - b) T=100m, B=-100m
 - c) T=200m, B=0m
 - d) T=300m, B=100m
 - e) T=400m, B=200m

- 14) How far down borehole X would you have to drill to find coal?
 - a) There is no coal in borehole X
 - b) 100m
 - c) 200m
 - d) 300m
 - e) 400m

- 15) The fault shown on the map would be best described as:
 - a) Non-rotational normal dip-slip
 - b) Non-rotational sinistral strike-slip
 - c) Non-rotational dextral strike-slip
 - d) Rotational reverse dip-slip
 - e) None of the above

Name.....

Figure 4 is a map that shows topographic contours, and the upper and lower structural contours for a sandstone unit. Look at the map carefully before answering the following questions.

- 16) The outcrop pattern of the sandstone would be best described as:
- It does not outcrop?
 - Linear, trending N-S
 - Sinuuous trending E-W
 - Approximately circular
 - Linear trending NE-SW
- 17) The maximum thickness of the sandstone in the area covered by the map is:
- 100m
 - 200m
 - 300m
 - 400m
 - 500m
- 18) The thickness of the sandstone at localities A, B and C is:
- A=100m, B=200m, C=100m
 - A=0m, B=100m, C=200m
 - A=100m, B=300m, C=200m
 - A=0m, B=300m, C=100m
 - A=200m, B=200m, C=100m
- 19) The shape of the sandstone unit along a N-S cross-section would be:
- Both boundaries would be sub-parallel and synformal
 - Both boundaries would be sub-parallel and sub-horizontal
 - Both boundaries would be sub-parallel and dip to the north
 - The upper boundary would be sub-horizontal and the lower boundary synformal
 - The lower boundary would be sub-horizontal and the upper boundary synformal
- 20) The shape of the sandstone unit along an E-W cross-section would be:
- Both boundaries would be sub-parallel and synformal
 - Both boundaries would be sub-parallel and sub-horizontal
 - Both boundaries would be sub-parallel and dip to the north
 - The upper boundary would be sub-horizontal and the lower boundary synformal
 - The lower boundary would be sub-horizontal and the upper boundary synformal

Name.....

Figure 5 is a topographic map showing the fold data collected at 6 localities. Use the information gained from the map to answer the following questions.

- 21) On the cross-section 1-1' the minor fold that plunges 5° N in the top left hand corner of the map would plot:
- a) At 11.4m
 - b) At 130m
 - c) At 511.4m
 - d) At 630m
 - e) At 488.6m
- 22) How many of the folds would plot below the topographic surface when projected onto the cross-section 1-1'.
- a) All of them
 - b) 4
 - c) 3
 - d) 2
 - e) 1
- 23) What can you deduce about the nature of the folding in the area of the map?
- a) The folds are symmetrical and tight with a vertical axial plane
 - b) The folds are asymmetrical and tight with an inclined axial plane
 - c) The folds are symmetrical and open with a vertical axial plane
 - d) The folds are asymmetrical and open with an inclined axial plane
 - e) The folds are isoclinal with an inclined axial plane
- 24) Does the cross-section give you a true idea as to the nature of the folds?
- a) Yes
 - b) No, the limbs of the fold appear to be longer than they actually are
 - c) No, the limbs of the fold appear to be shorter than they actually are
 - d) No, the inter-limb angle is much greater than it really is
 - e) No, the inter-limb angle is much greater than it really is
- 25) If you were trying to identify a fold hinge on a geological map which of the following features would you look for?
- a) Large angle between bedding and cleavage
 - b) Changes in outcrop pattern unrelated to topography
 - c) Minor folds
 - d) All of the above
 - e) Only B and C

- 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