Name _____

14 December, 1994

347K FINAL EXAM

Answer the following questions. Answers should be concise and relevant; answers do not need to be lengthened to fill all the available space! No credit for extraneous b.s..

1) Choose one of the many gems discussed this semester and describe: a) Its optical and physical properties that make it a good gem; b) Identifying characteristics that distinguish it from similar looking gems or synthetic materials; c) Primary sources of origin and geologic occurrence; d) Method(s) of treatment used to improve appearance or color; e) factors that influence value, particularly those that are unique to the gem.

2) Sapphires range in price from a few dollars per carat to as much as $8000 or more per carat. a) If it's all sapphire, why the extremely large range in price? b) Give examples of sapphire that would command the greatest and lowest price per carat.

3) The argument is occasionally made that the laboratory techniques used to synthesize gem materials are essentially the same as the processes that form gems in nature, and thus that synthetic gems are in no way inferior to their natural counterparts. This statement is sometimes followed by the assertion: "In fact, by carefully controlling conditions in the laboratory, it is possible to make gems that are more perfect than naturals so that synthetic gems are really superior to natural gems".

What, if anything, is wrong with these statements?

4) Opal differs from most of the gem minerals we discussed this semester in several important respects. What are some of these differences?

5) Several of the gems we discussed this semester originate in pegmatites or high temperature hydrothermal veins. If you were interesting in prospecting for them how would you go about doing so? Specifically, what gem minerals (give at least 4) are you looking for, and what types of rocks are most likely to contain these 2 kinds of deposits? If your stuck, think about the processes involved and the conditions required.

6) Beryl and garnet are mineral *groups* that contain several gem varieties. a) What are the common gem varieties in each of these group and how do they differ? b) Where are they found? c) Of the varieties you've listed which are the most highly valued?

7) List the technique(s) used to distinguish:

a) natural pearl from nucleated cultured pearl

b) flame fusion synthetic ruby from natural ruby

c)ruby from garnet

d) diamond from cubic zirconia

e) topaz from citrine

f) synthetic amethyst from natural amethyst

g) emerald from green glass

h) opal from synthetic opal

i) emerald from synthetic emerald

j) natural blue topaz from irradiated/heated blue topaz

8) What, if any, treatments are used to enhanced the clarity and/or color of the following gem materials, and what is the result of the treatment?

a) diamond

b) red garnet

c) pearl

d) emerald

e) ruby

f) aquamarine

g) chrome tourmaline

h) blue topaz

9) What is(are) the visual difference(s) between:

a) Imperial Topaz and yellow Topaz

b) Carnelian and Onyx

c) Opal doublet and Opal triplet

d) Padparadscha and Kashmir sapphire

e) Green Beryl and Emerald

f) Natural pearl and Cultured pearl

g) Chrome tourmaline and bicolor tourmaline

h) Synthetic star sapphire and natural star sapphire

i) Rhodolite and Tsavorite

j) natural blue topaz and irradiated/heated blue topaz

k) "Burma" ruby and "Thai" ruby

10) A G.I.A. diamond grading certificate states the following:

Color - H
Clarity - I_1
Cut - 6.5 mm Standard Round Brilliant
table % = 55
depth % = 63
Girdle thin
Polish good
Weight - 0.997 carats

What does this diamond look like? Comment on any aspect of this gemstone that might detract from its value. Is this a diamond that would command a price near the top of the range for its size? Why or why not?