

B.Sc. Semester II (Honours) Examination 2018

GEOLOGY

Subject Code : 22001

Course Code : SH/GEL/201/C-T3

Course Title : Elements of Geochemistry

Time: 1 hr.15 min

Full Marks: 25

The figures in the right hand side indicate marks.

1. Answer *any five* questions from the following : 1×5=5
 - (a) Name the most abundant element in the Earth.
 - (b) State the Oddo Harkins rule for relative abundance of elements.
 - (c) Name one lithophile element which is alkaline and incompatible.
 - (d) What is CHUR?
 - (e) What is diadochy?
 - (f) Define Peacock's Alkali Lime Index (PALI).
 - (g) Which group and period of the Periodic Table contain the Rare Earth Element?
 - (h) Define Magnesium Number (Mg #) of a rock.
2. Answer *any two* questions from the following : 5×2=10
 - (a) Write a short note on Goldschmidt's and Ringwood's rules for elemental substitution.
 - (b) Briefly discuss about the isotopic fractionation of oxygen during melting and evaporation.
 - (c) Compare advection and diffusion with respect to element transport in the earth.
 - (d) "The solubility of iron (Fe^{3+}) at a fixed temperature is controlled by pH of the medium"- explain.
3. Answer *any one* question from the following. 10×1=10
 - (a) Briefly describe the role of temperature, pressure and H_2O in partial melting of rocks to produce magma.
 - (b) Briefly discuss about the principle of radiometric dating by K-Ar method. What are the disadvantages of K-Ar dating method? 7+3=10

BNK22001

B.Sc. Semester II (Honours) Examination 2018

GEOLOGY

Subject Code : 22002

Course Code : SH/GEL/202/C-T4

Course Title : Structural Geology

Time: 1 hr.15 min.

Full Marks: 25

The figures in the right hand side margin indicate marks.

1. Answer *any five* questions from the following : 1×5=5
 - (a) What is Young's Modulus?
 - (b) What is creep?
 - (c) What is a-b joint?
 - (d) Define strike-slip fault.
 - (e) Name two primary sedimentary structures that are useful for determination of stratigraphic younging.
 - (f) Define rake (pitch) of a line.
 - (g) What is interlimb angle of a fold?
 - (h) Define an antiformal syncline.
2. Answer *any two* questions from the following : 5×2=10
 - (a) Briefly discuss the role of anisotropy in rock deformation.
 - (b) How would you locate the major fold closure from cleavage-bedding relationship?
 - (c) State the geometrical classification of folds as proposed by Ramsay.
 - (d) Show the following parts of a fold on suitable sketch. Hinge, Inflection Point, Median Surface, Crest, Trough.
3. Answer *any one* from the following questions : 10×1=10
 - (a) Write a note on the various types of lineation found in rocks.
 - (b) What is an unconformity? How would you recognise an unconformity in field? Name and draw illustrative sketches of the different types of unconformity. 1+4+5=10

BNK22002

B.Sc. Semester II (Honours) Examination 2018**GEOLOGY****Subject Code : 22011****Course Code : SH/GEL/201/C-P3****Course Title : Elements of Geochemistry Lab****Time: 2 Hours****Full Marks: 15***The figures in the right hand margin indicate marks.*

1. The chemical analyses of four igneous rocks belonging to a magma series are as follows:

Oxides (wt%)	Rock-1	Rock-2	Rock-3	Rock-4
SiO ₂	66.2	54.3	60.1	71.5
TiO ₂	0.5	0.8	0.7	0.3
Al ₂ O ₃	15.3	15.7	16.1	14.1
FeO	5.1	9.2	6.9	2.8
MgO	0.9	3.7	2.8	0.5
CaO	3.5	8.2	5.9	1.1
Na ₂ O	3.9	3.2	3.8	3.4
K ₂ O	3.1	2.1	2.5	4.1
LOI	1.2	2.0	1.8	1.4
Total	99.7	99.2	100.6	99.2

Calculate magnesium number (Mg[#]) of the rocks. Plot SiO₂, Al₂O₃, FeO, CaO, Na₂O and K₂O (wt%) against Mg[#] of the rocks. Describe the nature of variation of the oxides with change in Mg[#]. Molecular weight: MgO = 40.30; FeO = 71.85. 4+4+4=12

2. Laboratory Note book.

3

BNK22011

B.Sc. Semester II (Honours) Examination 2018

GEOLOGY

Subject Code : 22012

Course Code : SH/GEL/202/C-P4

Course Title : Structural Geology Lab

Time: 2 Hours

Full Marks: 15

The figures in the right hand side margin indicate marks.

Answer all the questions:

1. Study the given geological map (B.Sc.-II/SH/GEL/202/C-P4/18) and answer the following questions.
 - (a) How many rock groups are there? List the lithounits of each group. ½+½=1
 - (b) Mark the discontinuity surface(s) between the rock groups. 1
 - (c) Describe the structure of each rock group. 3
 - (d) Comment on the nature of discontinuity surface(s). 2
2. Attitude of the two limbs of a fold are $32^{\circ} \rightarrow 200^{\circ}$ and $40^{\circ} \rightarrow 110^{\circ}$ respectively. Find out the orientation of the fold axis. Determine the pitch and plunge of the fold axis. 2+3=5
3. Laboratory note book. 3

