# K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

## DEPARTMENT OF CIVIL ENGINEERING

## I SESSIONAL TEST QUESTION PAPER 2019 – 20 ODD SEMESTER

## SET-A

| USN | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

**Degree** : B.E
**Branch** : Civil Engineering
**Course Title** : Engineering Geology
**Duration** : 90 Minutes

**Semester** : III
**Date** : 3-9-2019
**Course Code** : 18CV36
**Max Marks** : 30

**Note: Answer ONE full question from each part**

| Q. No. | Question | Marks | K Level | CO mapping |
|---|---|---|---|---|
| | **PART-A** | | | |
| 1(a) | **Define** Engineering geology and **explain** any five branches of geology. | 5 | K2 Understanding | CO1 |
| (b) | **Define** a mineral and **explain** the diaphaneity of the mineral. | 5 | K2 Understanding | CO1 |
| (c) | **Discuss** the properties of Granite and Sandstone. | 5 | K2 Understanding | CO2 |
| | **OR** | | | |
| 2(a) | With a neat **sketch explain** the internal structure of the earth. | 5 | K2 Understanding | CO1 |
| (b) | **What** is an ore mineral and **explain** the physical properties of Bauxite. | 5 | K2 Understanding | CO1 |
| (c) | **Discuss** the properties of Shale and Laterite. | 5 | K2 Understanding | CO2 |
| | **PART-B** | | | |
| 3(a) | **Explain** the following: i) Fracture of the mineral ii) Colour of the mineral | 5 | K2 Understanding | CO1 |
| (b) | **Discuss** the properties of Feldspar group. | 5 | K2 Understanding | CO1 |
| (c) | **Explain** the structures of the sedimentary rocks. | 5 | K2 Understanding | CO2 |
| | **OR** | | | |
| 4(a) | **Discuss** the applications of geology in civil engineering. | 5 | K2 Understanding | CO1 |
| (b) | **Explain** the streak and lustre of the minerals. | 5 | K2 Understanding | CO1 |
| (c) | **Discuss** the properties of Quartzite and Marble. | 5 | K2 Understanding | CO2 |

**Course In charge** **Head – Dept** **Principal**

# K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

## DEPARTMENT OF CIVIL ENGINEERING

## I SESSIONAL TEST SCHEME & SOLUTION 2018 – 19 ODD SEMESTER

## SET-A

| USN | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Degree** | : | **B.E** | **Semester** | : | **V** |
| **Branch** | : | **Civil Engineering** | **Date** | : | **3-9-2019** |
| **Course Title** | : | **Engineering Geology** | **Course Code** | : | **18CV36** |
| **Duration** | : | **90 Minutes** | **Max Marks** | : | **30** |

**Note: Answer ONE full question from each part**

| Q. No. | Questions with Scheme & Solution | Marks | K Level | CO mapping |
|---|---|---|---|---|
| | **PART-A** | | | |
| 1(a) | **Define** Engineering geology and **explain** any five branches of geology. | 5 | K2 Understanding | CO1 |
| Sol | **Engineering Geology**: deals with the application of geology for a safe, stable and economic design and construction of a civil engineering project.<br>1. **Physical Geology-:** It deals with the origin, development and ultimate fate of various surface features of the Earth and also with its internal structure.<br>**2. Geomorphology:** deals with the study of surface features of the earth, primarily of the land surface.<br>**3. Mineralogy:** This deals with formation, occurrence, aggregation, properties and uses of minerals. Minerals are the basic building units.<br>**4. Petrology:** This deals specifically with nature and distribution of rocks on the earth and geological explanations governing such a distribution.<br>**5. Mining Geology:** It is geology as applied to mining and quarrying practice that is for the exploration and exploitation of economic mineral deposits. | 01<br>02<br>02 | | |
| (b) | **Define** a mineral and **explain** the diaphaneity of the mineral. | 5 | K2 Understanding | CO1 |
| Sol | **Mineral:** is a naturally occurring inorganic solid substance that is characterized with a definite chemical composition and very often with a definite atomic structure.<br>**Diaphaneity**: This property of a mineral is observed under natural light. Some minerals by virtue of their property allow light to pass through them such minerals are called **transparent minerals**. In some other minerals light is transmitted partially they are called **translucent minerals**. If light is not transmitted through the minerals such minerals are called **opaque minerals**. | 02<br>03 | | |
| (c) | **Discuss** the properties of Granite and Sandstone. | 5 | K2 Understanding | CO2 |

**Sol**

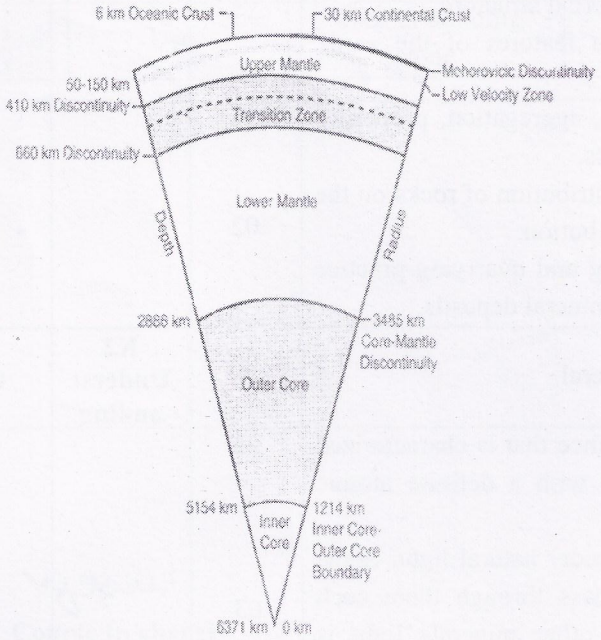
| Sl. No | Properties | Granite | Sandstone |
|---|---|---|---|
| 1 | Structure | Massive | Massive |
| 2 | Colour | Light Coloured | Light colour |
| 3 | Mineral Composition<br>a. Essential | Quartz and Orthoclase | Quartz |
| | b. Accessory | Muscovite<br>Biotite | Feldspar, Mica |
| 4 | Texture | Equigranular | Equigranular, Ripple marks |
| 5 | Mode of Occurrences | Plutonic | Occur thin and thick layers |
| 6 | Uses | Used as flooring matreials | Used as building stones |

2.5x 2

**OR**

| | | | | |
|---|---|---|---|---|
| **2(a)** | **With a neat sketch explain** the internal structure of the earth. | **5** | **K2 Underst anding** | **CO1** |

Sol




1

The body of the earth is subdivided into three layers or zones: 1. The Crust 2. The Mantle and 3. The Core.

1. Crust-3 layers, SIMA and SIAL, presence of the Mohorovicic discontinuity

2

| | | | | |
|---|---|---|---|---|
| | 2. Mantle- Asthenosphere- It is believed to be the source of much volcanic activity of the earth and many other processes. The asthenosphere is believed to be located entirely in the upper mantle and supports the slowly moving tectonic plates.<br>3. Core- Outer core and Inner Core- It is the innermost concentric shell of the earth as concluded from the record of seismic waves. The core boundary begins at depth of 2,900 km from the surface and it extends to the centre of the earth at 6,371 km. | 1<br><br><br><br><br>1 | | |
| **(b)** | **What** is an ore mineral and **explain** the physical properties of Bauxite. | **5** | **K2 Understanding** | **CO1** |
| **Sol** | **Ore mineral**: An ore is a natural occurrence of rock or sediment that contains sufficient minerals with economically important elements, typically metals, that can be economically extracted from the deposit. | 1 | | |

| **Sl. No** | **Physical Properties** | Bauxite (Aluminum Ore) |
|---|---|---|
| 1 | Habit/Structure | Oolitic and Amorphous |
| 2 | Colour | Reddish brown, grey |
| 3 | Hardness | 4 |
| 4 | Specific Gravity | 3 |
| 5 | Streak | Pale white |
| 6 | Lustre | Dull |
| 7 | Cleavage | Absent |
| 8 | Fracture | Uneven |
| 9 | Diaphaneity | Opaque |
| 10 | Composition | Al2O3.2H2O |
| 11 | Uses | It is used in the manufacture of chemicals, in cement industry and in refining petroleum. |

| | | | | |
|---|---|---|---|---|
| | | 4 | | |
| **(c)** | **Discuss** the properties of Shale and Laterite. | **5** | **K2 Understanding** | **CO2** |
| **Sol** | | 2.5x 2 | | |

| **Sl. No** | **Properties** | **Shale** | **Laterite** |
|---|---|---|---|
| 1 | Structure | Massive | Massive |
| 2 | Colour | Dark in colour | Medium coloured |
| 3 | Mineral Composition | Kaoline | Kaoline |
| | a. Essential | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | b. Accessory | Mica, Quartz | Magnetite | | |
| | 4 | Texture | Equigranular, Lamellar | Porphyritic | | |
| | 5 | Mode of Occurrences | Aquatic origin | Sedimentation | | |
| | 6 | Uses | Used in manufacture of cement | Used as building stone. | | |

**PART-B**

| | | | | |
|---|---|---|---|---|
| **3(a)** | **Explain** the following: i) Fracture of the mineral ii) Colour of the mineral | **5** | **K2 Understanding** | **CO1** |
| **Sol** | **i)Fracture:** the appearance of the broken surface of a mineral in a direction other than that of cleavage is generally expressed by the term fracture.<br>a.Even- when the broken surface is smooth and flat<br>b.Uneven- when the mineral breaks with an irregular surface<br>c.Conchoidal- the broken surface of the mineral shows broadly concentric rings<br>d.Hackly- the broken surface is highly irregular with numerous sharp<br>**ii) Colour:** the colour of any object is alight dependent property: it is the appearance **of** the particular object in light.<br>a)**Idiochromatic**: having a characteristic, fairly constant colour related primarily to the composition of mineral. E.g: Metallic minerals.<br>**b)Allochromatic**: having a variable colour; the variety in colour is generally due to minute quantities of colouring impurities thoroughly mixed in the mineral composition. E.g: Non- metallic minerals.<br>**c)Pseudochromatic**: showing false colour. Such an effect generally happens when a mineral is rotated in hand; it is then seen to show a set of colours in succession. E.g: Quartz Rock crystal. | 2<br>1<br>1<br>1 | | |
| **(b)** | **Discuss** the properties of Feldspar group. | **5** | **K2 Understanding** | **CO1** |
| **Sol** | | 2x 2<br>1x1 | | |

| Sl. No | Physical Properties | Plagioclase | Orthoclase | Microlcine |
|---|---|---|---|---|
| 1 | Habit/ Structure | Massive, Bladded | Massive, Bladded | Massive, Bladded |
| 2 | Colour | White, Grey | Orange | Greenish white |
| 3 | Hardness | 6 | 6 | 6 |
| 4 | Specific Gravity | 2.7 | 2.7 | 2.7 |
| 5 | Streak | Colourless | Colourless | Colourless |
| 6 | Lustre | Resinous | Sub vitreous | Resinous |
| 7 | Cleavage | Present | Present | Present |
| 8 | Fracture | Even-Uneven, Conchoidal | Even-Uneven, Conchoidal | Even-Uneven, Conchoidal |
| 9 | Diaphaneity | Opaque | Opaque | Opaque |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 10 | Composition | $Na.Al.Si_3O_8$ | $KAlSi_3O_8$ | $KAlSi_3O_8$ | | | |
| | 11 | Uses | As a Ceramic material | As a ceramic material | As a ceramic material and as a semi-precious stone | | | |
| **(c)** | **Explain** the structures of the sedimentary rocks. | | | | | **5** | **K2 Understanding** | **CO2** |
| **Sol** | 1. **Stratification** (or bedding) is expressed by rock layers (units) of a general tabular or lenticular form that differ in rock type or other characteristics from the material with which they are interstratified.<br>2.**Laminations-** thin layers, lamina<br>**3. Cross stratification-** is locally at some angle to the overall stratification as a consequence of changes in the geometry of the depositional surface during deposition.<br>4. **Ripple marks-**Ripple marks usually form in conditions with flowing water.<br>5. **Mud cracks**-cavity structures | | | | | 2<br>2<br>1 | | |
| | **OR** | | | | | | | |
| **4(a)** | **Discuss** the applications of geology in civil engineering. | | | | | **5** | **K2 Understanding** | **CO1** |
| **Sol** | Engineering Geology- branch of applied science deals with application of geology for a safe, stable and economic design and construction of a civil engineering project.<br>**The basic objects of a course in Engineering Geology are**<br>a. It enables a civil engineer to understand engineering implications of certain conditions related to the area of construction, which are essentially geological in nature.<br>b. It enables a geologist to understand the nature of geological information that is absolutely essential for a safe design and construction of a civil engineering project.<br>**i) Planning**: Following geological information is greatly useful in proper planning of an engineering project.<br>**ii) Design**: In the matter of designing of an engineering project, the role of geological information can be overstated.<br>iii) **Construction:**<br>During the actual execution of a civil engineering project, geological knowledge is of great value to an engineer in the selection and proper use of right type of materials of construction derived from the natural bedrocks. | | | | | 1<br>2<br>1<br>1 | | |
| **(b)** | **Explain** the streak and lustre of the minerals. | | | | | **5** | **K2 Understanding** | **CO1** |
| **Sol** | Streak is the colour of the finely powdered mineral as obtained by scratching or rubbing the mineral over a rough unglazed porcelain plate. | | | | | 2 | | |

<table>
<tr><td></td><td>It is the shine of a mineral. Technically it is intensity of reflection of light from the mineral surfaces and depends at least on three factors.<br>i. The refractive index of the mineral<br>ii. The absorption capacity of the mineral<br>iii. The nature of reflecting surface.</td><td>3</td><td></td><td></td></tr>
<tr><td>(c)</td><td>Discuss the properties of Quartzite and Marble.</td><td>5</td><td>K2 Understanding</td><td>CO2</td></tr>
<tr><td>Sol</td><td>
<table>
<tr><th>Sl. No</th><th>Properties</th><th>Quartzite</th><th>Marble</th></tr>
<tr><td>1</td><td>Structure</td><td>Massive</td><td>Massive</td></tr>
<tr><td>2</td><td>Colour</td><td>Medium colour</td><td>Medium colour</td></tr>
<tr><td rowspan="3">3</td><td>Mineral Composition</td><td rowspan="2">Quartz</td><td rowspan="2">Calcite</td></tr>
<tr><td>a. Essential</td></tr>
<tr><td>b. Accessory</td><td>Feldpsar</td><td>Magnetite</td></tr>
<tr><td>4</td><td>Texture</td><td>Equigranular, Lamellar</td><td>Granular</td></tr>
<tr><td>5</td><td>Mode of Occurrences</td><td>Dynamic metamorphism</td><td>Contact metamorphism</td></tr>
<tr><td>6</td><td>Uses</td><td>Used in building stone</td><td>Construction purposes.</td></tr>
</table>
</td><td>2.5x 2</td><td></td><td></td></tr>
</table>

Course In charge

Head - Dept

Principal

# K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

## DEPARTMENT OF CIVIL ENGINEERING

## II SESSIONAL TEST QUESTION PAPER 2019– 20 ODD SEMESTER

## SET-B

USN | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Degree | : | B.E | Semester | : | III |
| Branch | : | Civil Engineering | Date | : | 14-10-2019 |
| Course Title | : | Engineering Geology | Course Code | : | 18CV36 |
| Duration | : | 90 Minutes | Max Marks | : | 30 |

**Note: Answer ONE full question from each part**

| Q. No. | Question | Marks | K Level | CO mapping |
|---|---|---|---|---|
| | **PART-A** | | | |
| 1(a) | **Define** a river drainage pattern and **explain** the different types of drainage pattern. | 5 | K2 Understanding | CO2 |
| (b) | **Define** a dip and **explain** the different types of dips. | 5 | K2 Understanding | CO3 |
| (c) | **Explain** the following: i) Hanging wall and foot wall ii) Fault plane | 5 | K2 Understanding | CO3 |
| | **OR** | | | |
| 2(a) | **Write a note** on lakes. | 5 | K2 Understanding | CO2 |
| (b) | **Define** a fold and **explain** the types of folds. | 5 | K2 Understanding | CO3 |
| (c) | **Write a note** on geological considerations for tunnel construction. | 5 | K2 Understanding | CO3 |
| | **PART-B** | | | |
| 3(a) | **Explain** the effects of weathering on civil engineering projects. | 5 | K2 Understanding | CO2 |
| (b) | **Explain** the classification of joints. | 5 | K2 Understanding | CO3 |
| (c) | **Write a note** on coastlines. | 5 | K2 Understanding | CO3 |
| | **OR** | | | |
| 4(a) | **Discuss** the index properties of rocks. | 5 | K2 Understanding | CO2 |
| (b) | With a neat **sketch explain** the recumbent fold. | 5 | K2 Understanding | CO3 |
| (c) | **Write a note** on classification of the fault based on the mode of occurrence. | 5 | K2 Understanding | CO3 |

(B)

Course In charge | Head - Dept | Principal

# K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

## DEPARTMENT OF CIVIL ENGINEERING

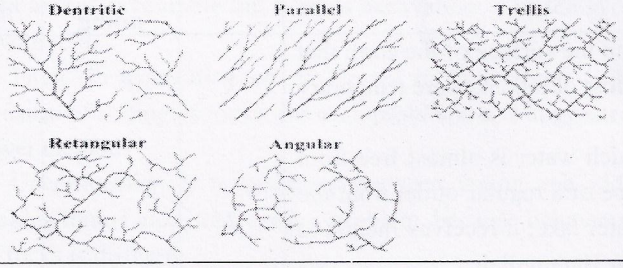
## II SESSIONAL TEST SCHEME & SOLUTION 2019 – 20 ODD SEMESTER

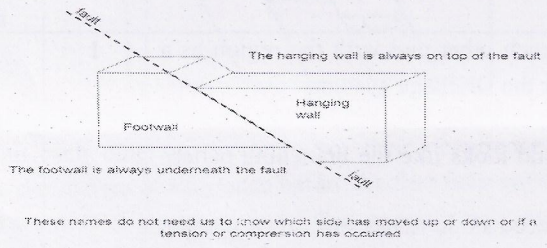
## SET-B

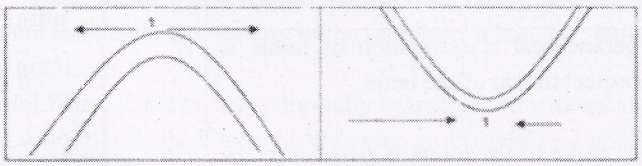
| USN | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

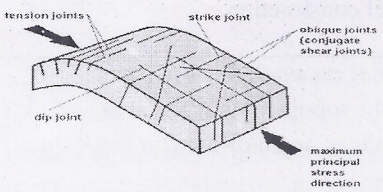
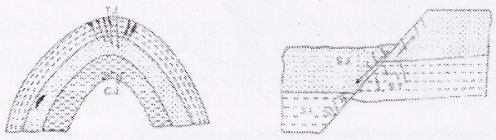
| | | | | | |
|---|---|---|---|---|---|
| **Degree** | : | **B.E** | **Semester** | : | **III** |
| **Branch** | : | **Civil Engineering** | **Date** | : | **14-10-2019** |
| **Course Title** | : | **Engineering Geology** | **Course Code** | : | **18CV36** |
| **Duration** | : | **90 Minutes** | **Max Marks** | : | **30** |

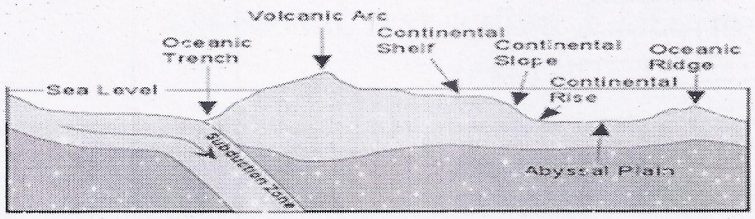
**Note: Answer ONE full question from each part**

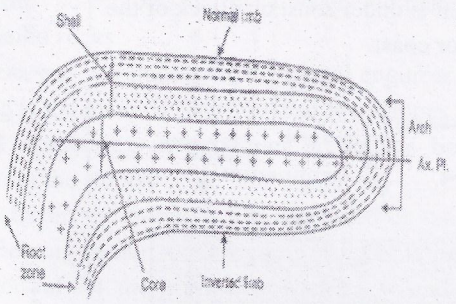
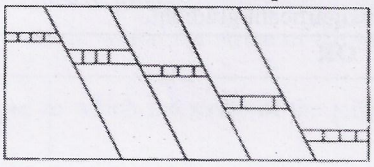
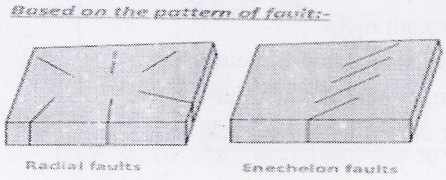
| Q. No. | Questions with Scheme & Solution | Marks | K Level | CO mapping |
|---|---|---|---|---|
| | **PART-A** | | | |
| 1(a) | **Define** a river drainage pattern and **explain** the different types of drainage pattern. | 5 | K2 Understanding | CO2 |
| Sol | The relationship of all the streams with each other and with the region as a whole gives rise to the Drainage pattern or the Drainage system.<br>**Types**<br>**i. Dendritic**: is the most common form and looks like the branching pattern of tree roots.<br>**ii. Parallel**: form where there is a pronounced slope to the surface. A parallel pattern also develops in regions of parallel, elongate landforms like outcropping resistant rock bands.<br>**iii. Trellis**: when a consequent stream receives a number of subsequent streams from right and left at approximately right angles to its direction of flow.<br>**iv. Rectangular**: stream joins in a rectangular shape.<br>v. **Radial or Angular**: streams may be either flowing out from a central elevated region or flowing towards a common central region.<br>  | 1<br><br><br>2<br><br><br><br><br>2 | | |
| (b) | **Define** a dip and **explain** the different types of dips. | 5 | K2 Understanding | CO3 |
| | **Dip:** Dip is defined as the maximum angle of inclination of a layer of a rock | 2 | | |

| | | | | |
|---|---|---|---|---|
| | with the horizontal. It is expressed both in terms of degree inclination and direction of inclination.<br>**Types of Dip**<br>**1. True Dip:** when the dip of a layer is measured in a direction that is essentially at right angles to the strike of that particular layer.<br>**2. Apparent Dip:** when the dip of a layer is measured in any other direction. Which is not at right angles to its strike direction it is called an apparent dip.<br>$\tan \alpha = \tan\beta . \cos \gamma$<br>Where<br>$\alpha$ – apparent dip angle<br>$\beta$- angle of true dip<br>$\gamma$- angle between the strike of the layered and the direction in which the apparent dip is measured. | 1<br>1<br>1 | | |
| (c) | **Explain** the following: i) Hanging wall and foot wall ii) Fault plane | 5 | K2 Understanding | CO3 |
| Sol | i) **Hanging wall and Foot wall:** A fault plane separates the two blocks and each block is known as a wall. If the fault plane is inclined, then the block lying over the fault plane is called the hanging wall, whereas, the block lying the beneath, i.c underside of the fault plane is called the foot wall.<br>  <br><br>**ii) Fault plane:** the surface along which fracture occurs in the rock body, and there occurs a relative movement between the so formed rock parts, is termed as Fault plane or Fault surface. This surface may be smooth, uneven and may be horizontal, vertical or inclined position. | 1<br>3<br>1 | | |
| | **OR** | | | |
| 2(a) | **Write a note** on lakes. | 5 | K2 Understanding | CO2 |
| Sol | Any depression or hollow of considerable size in the surface of the earth that is filled with water may be defined as a lake. Most of the lakes are temporary in character.<br>**a) Fresh Water Lakes**: These are lakes in which water is almost free from salts. This becomes possible because of presence of a regular outlet from the lake. The Wular Lake of Kashmir is a fresh water lake; it receives Jhelum at one end which drains out from the other end near Baramullah.<br>**b) Saline Lakes:** Water of such lakes is characterized with high content of salts. This becomes possible due to absence of an outlet and/ or an excessive rate of evaporation, which leads to heavy concentration of salts in the lake | 1<br>2<br>2 | | |

| | | | | |
|---|---|---|---|---|
| | water.<br>E.g- the great Salt lake (USA), the Caspian sea (Russia), the lake Chad(Nigeria) and Sambhar salt lake ( Rajasthan, India) | | | |
| (b) | **Define** a fold and **explain** the types of folds. | 5 | K2 Understanding | CO3 |
| Sol | Folds may be defined as undulations or bends that are developed in the rocks of the earth's crust, as a result of the stresses to which these rocks have been subjected to form time to time in the past history of the earth.<br>**Types of Fold**<br>1. Anticline: The strata are up arched, that is, these become CONVEX Upwards. The geologically older rocks occupy a position in the interior of the fold, oldest being positioned at the core of the fold and the youngest forming the outermost flank. The limbs dip away from each other at the crest.<br>  <br>Fig. Anticline and Syncline<br>**2. Syncline:** The strata are down arched that are these become CONVEX downwards. The geologically younger rocks occupy a position in the core of the fold and the older rocks form the outer flanks. | 1<br>2<br>2 | | |
| (c) | **Write a note** on geological considerations for tunnel construction | 5 | K2 Understanding | CO3 |
| Sol | a) Topography: One of the factors required for Tunnel excavation is sufficient depth of cut. This can be determined by studying the topography of the area, the elevation on the ground in turns of contour values are indicated in top sheet.<br>b) Rock type: It is very much necessary to determine the type of rock existing along the tunnel alignment.<br>c) Structure: The joints are portion planes which divided rock into number of blocks, which creates unstable **condition** for tunnel.<br>a) Folds: In excavation of Tunnel in anticline folds both along and across the fold axis is favourable but tunnels excavation in the synclinal fold, is not favourable.<br>b) Fault: In excavation on of Tunnel in fault zones is highly impossible because of sliding of rocks, for such problems it is suggested to adopt cut and cover method.<br>c) Unconformity: It is boundary between young and old layers of rocks, making tunnel along this creates problem, because behaviour of the two types of rocks is different. | 1<br>2<br>2 | | |
| | **PART-B** | | | |
| 3(a) | **Explain** the effects of weathering on civil engineering projects. | 5 | K2 Understanding | CO2 |

| | | | | |
|---|---|---|---|---|
| Sol | i) It may be necessary to remove the loose weathered material and carry the foundation to the solid rocks.<br>ii) Weathering processes are important for a civil engineer from yet another aspect. Weathering is the main cause of instability of slopes in many areas.<br>iii) The chemical weathering in particular breaks the bonds between the various rocks making the slopes.<br>iv) When bond between the minerals are weakened or totally removed, the slope rocks lose shearing strength and become prone to failure.<br>v) It is very important for the construction engineer and architects before recommending use of some special type of stones in major constructions (marble, lime stones, granites etc) to determine possible response of such stones towards the chemical environment of the area. | **Any five effects**<br>**5 x1** | | |
| **(b)** | **Explain** the classification of joints. | **5** | **K2 Understanding** | **CO3** |
| Sol | **A) Geometrical classification:** The geometrical classification of joints is based on the attitude of the joints with respect to that of the beds.<br>According to this three types of joints<br>**i) Strike Joints-** are those in which the strike of the joints is parallel to the strike of the beds.<br>**ii) Dip joints-** are those in which the strike of the joints is perpendicular to the strike of the beds.<br>**iii) Oblique joints-**are those in which the strike of the joints neither parallel nor normal to the strike of the beds.<br>  <br>Fig. Geometrical classification<br>**B) Genetic Classification:**<br>**i) Tension Joints-** are those, which have developed due to the tensile forces acting on the rocks.<br>**ii) Compression Joints-** rocks may be compressed to crushing and numerous joints may result due to the compressive forces in this case.<br>**iii) Shear joints-** these are commonly observed in the vicinity of fault planes and shear zones where the relationship with shearing forces is clearly established.<br>  <br>Fig. Genetic Classification | **3**<br>**2** | | |
| **(c)** | **Write a note** on coastlines. | **5** | **K2 Understanding** | **CO3** |

| | | | | |
|---|---|---|---|---|
| Sol | The land area adjoining to the sea or ocean that is under constant attack of the marine waters is called coastline or seashore or coast.<br>  <br><br>Fig. Coastlines<br>a) Continental shelf: It is the gently sloping land part that remains partly submerged under sea water. It may be only a narrow strip or quite an extensive area stretching for hundreds of kilometres.<br>b) Continental Slope: It is the slope starting from the farthest end of the continental shelf and continues up to the sea floor. It may be gently or very steep in gradient.<br>c) Abyssal Plain: Each ocean is normally characterized with an abyssal plain or abyssal floor. It is the almost level having an insignificant gradient. | 1<br>2<br>2 | | |
| | **OR** | | | |
| **4(a)** | **Discuss** the index properties of rocks. | **5** | **K2 Understanding** | **CO2** |
| **Sol** | **1. Porosity**: Porosity is the percentage of void space in a rock. It is defined as the ratio of the volume of the voids or pore space divided by the total volume<br>**2. Density**: Density is defined as the mass per volume. In rocks, it is a function of the densities of the individual grains, the porosity, and the fluid filling the pores.<br>**3. Permeability**: Permeability is the property of rocks that is an indication of the ability for fluids (gas or liquid) to flow through rocks.<br>**4. Durability**: Durability may be defined as resistance to destruction. If a rock mass is more durable, it will last for a longer period when put to a use. Greater the loss weight in weight, poorer the durability of the rock. | 3<br>2 | | |
| **(b)** | With a neat **sketch** explain the recumbent fold. | **5** | **K2 Understanding** | **CO3** |
| **Sol** | Recumbent fold: In such folds, one limb comes to lie exactly under the other limb. It contains: The arch- which is zone of curvature. The shell- which is the outer zone, The core- innermost part of the fold and the root or the root zone- which is the basal part of the fold | 2<br>2<br>1 | | |

| | | | | |
|---|---|---|---|---|
| |  | | | |
| (c) | **Write a note** on classification of the fault based on the mode of occurrence. | 5 | K2 Understanding | CO3 |
| Sol | **Mode of Occurrence :**<br>**i) Parallel Faults:** A group of faults occurring in close proximity having their fault planes striking essentially in the same direction and having parallel and equal dips fork what are commonly called parallel faults.<br>  <br>**ii) Enechelon Faults:** these may be defined as a group of small sized faults that overlap each other in the region of their occurrence. A second fault appears on the surface at a distance before the first fault ends and so on.<br>**ii) Radial Faults:** A group of faults that appear emerging outward from a common central region are classed as radial faults.<br>  <br> | 2<br>3 | | |

Course In charge

Head - Dept

Principal

# K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

## DEPARTMENT OF CIVIL ENGINEERING

## III SESSIONAL TEST QUESTION PAPER 2019– 20 ODD SEMESTER

## SET-A

| USN | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Degree** | : | **B.E** | **Semester** | : | **III** |
| **Branch** | : | **Civil Engineering** | **Date** | : | **25-11-2019** |
| **Course Title** | : | **Engineering Geology** | **Course Code** | : | **18CV36** |
| **Duration** | : | **90 Minutes** | **Max Marks** | : | **30** |

**Note: Answer ONE full question from each part**

| Q. No. | Question | Marks | K Level | CO mapping |
|---|---|---|---|---|
| | **PART-A** | | | |
| 1(a) | With a neat **sketch explain** the vertical distribution of ground water. | 5 | K2 Understanding | CO4 |
| (b) | **Explain** the following : i) Aquitard ii) Aquifuge iii) Aquifer | 5 | K2 Understanding | CO4 |
| (c) | **Write a note** on the volcanic eruptions. | 5 | K2 Understanding | CO5 |
| | **OR** | | | |
| 2(a) | **Explain** the electrical resistivity method for ground water exploration. | 5 | K2 Understanding | CO4 |
| (b) | **Explain** the sodium absorption ratio. | 5 | K2 Understanding | CO4 |
| (c) | **Define** GIS and **explain** the components of GIS. | 5 | K2 Understanding | CO5 |
| | **PART-B** | | | |
| 3(a) | **Explain** the storage coefficient and permeability. | 5 | K2 Understanding | CO4 |
| (b) | **Write a note** on different methods of artificial recharge of ground water. | 5 | K2 Understanding | CO4 |
| (c) | **Explain** the limitations of remote sensing. | 5 | K2 Understanding | CO5 |
| | **OR** | | | |
| 4(a) | **Explain** the total hardness of water. | 5 | K2 Understanding | CO4 |
| (b) | **Write a note** on cyclones and its effects. | 5 | K2 Understanding | CO4 |
| (c) | **Explain** the following: i) Richter scale ii) Focus and Epicentre. | 5 | K2 Understanding | CO5 |

(5)

Course In charge

Head - Dept

Principal

# K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

## DEPARTMENT OF CIVIL ENGINEERING

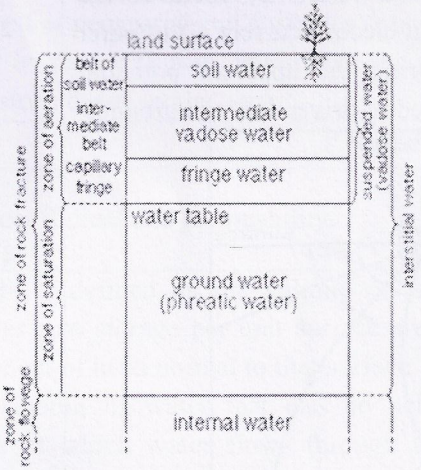
## III SESSIONAL TEST SCHEME & SOLUTION 2019 – 20 ODD SEMESTER

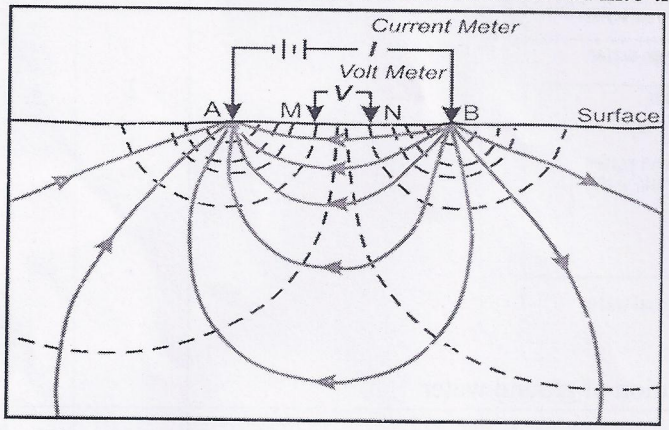
## SET-A

| USN | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Degree** | : | **B.E** | **Semester** | : | **III** |
| **Branch** | : | **Civil Engineering** | **Date** | : | **14-10-2019** |
| **Course Title** | : | **Engineering Geology** | **Course Code** | : | **18CV36** |
| **Duration** | : | **90 Minutes** | **Max Marks** | : | **30** |

**Note: Answer ONE full question from each part**

| Q. No. | Questions with Scheme & Solution | Marks | K Level | CO mapping |
|---|---|---|---|---|
| | **PART-A** | | | |
| **1(a)** | With a neat **sketch explain** the vertical distribution of ground water. | **5** | **K2 Understanding** | **CO4** |
| **Sol** | Vertical distribution of ground water: The occurrence of ground water may be divided into zones of aeration and saturation<br>**i. Zone of aeration** - a) Soil water zone<br>b) The intermediate vadose zone and c) Capillary zone<br>**ii. Zone of saturation or Phreatic water zone-** | **3** | | |
| |  <br>Fig. Vertical distribution of ground water. | **2** | | |
| **(b)** | **Explain** the following : i) Aquitard ii) Aquifuge iii) Aquifer | **5** | **K2 Understanding** | **CO4** |
| **Sol** | i) **Aquitard**: It is a less common term used sometimes for aquifuge or aquiclude that has become locally leaky due to development of partial perviousness caused because of porous jointing or cracks horizontal plane with a bedding plane of a layer of rock.<br>**ii) Aquifuge**: It is an absolutely impermeable rock formation through which there is no possibility of storage or movement of water. Such a formation is almost free from pores and other interstices. | **2**<br>**1** | | |

| | | | | |
|---|---|---|---|---|
| | iii) **Aquifer**: It is defined as a rock mass, layer or formation which is saturated with ground water and which by virtue of its properties is capable of yielding the contained water at economical costs when tapped. | 2 | | |
| **(c)** | **Write a note** on the volcanic eruptions. | 5 | **K2 Understanding** | **CO5** |
| **Sol** | A volcanic eruption occurs when hot materials from the Earth's interior are thrown out of a volcano. Lava, rocks, dust, and gas compounds are some of these "ejecta". Eruptions can come from side branches or from the top of the volcano. Some eruptions are terrible explosions that throw out huge amounts of rock and volcanic ash and can kill many people.<br>**Effects:**<br>i) Volcanic eruptions can cause earthquakes, fast floods, mud slides, and rock falls. Lava can travel very far and burn, bury, or damage anything in its path, including people, houses, and trees.<br>ii) The large amount of dust and ash can cause roofs to fall, makes it hard to breathe, and is normally very smelly.<br>iii) The ground around the volcano is not secure and can cause big earthquakes.<br>iv) A lot of scientists believe that really big volcanic eruptions can change weather around the world. Ash clouds sometimes float very high in the air for years, so sunlight cannot get to the earth, causing snow and frost in the summer in a lot of countries. | 2<br>2<br>2 | | |
| | **OR** | | | |
| **2(a)** | **Explain** the electrical resistivity method for ground water exploration. | 5 | **K2 Understanding** | **CO4** |
| **Sol** | **Electrical Resistivity Method:** In the electrical resistivity method, the electrical resistance is determined by applying an electric current (I) to outer electrodes driven into the ground and measuring the apparent potential difference (V) between two inner electrodes buried or driven into the ground.<br>  <br><br>Fig: Electrical circuit for resistivity determination<br>**R=V/I**<br>where I-electric current<br>V-voltage difference between potential electrodes.<br>The depth at which current enters a formation of higher or lower resistivity is signaled by a change in the resitivities recorded at the ground surface.<br>ii) Seismic method for ground water exploration: | 2<br>1<br>1 | | |
| **(b)** | **Explain** the sodium absorption ratio. | 5 | **K2 Understanding** | **CO4** |

| | | | | |
|---|---|---|---|---|
| Sol | **Sodium absorption ratio(SAR):** is a measure of the suitability of water for use in agricultural, irrigation and as well as for drinking purpose.<br>The SAR is determined by the concentration of solids dissolved in the water and it is also a measure of the sodicity of soil as determined from analysis of water extracted from the soil.<br>Based on the ratio of SAR , water can be rated into different categories<br>Safe <10 mg/l<br>Moderately safe- 10-18 mg/l<br>Moderately unsafe-19-26 mg/l<br>Unsafe >26 mg/l | 3<br><br><br><br><br>2 | | |
| (c) | **Define** GIS and **explain** the components of GIS. | 5 | K2 Understanding | CO5 |
| Sol | **GIS:** it can be defined as a system that is used to input, store, retrieve, manipulate, analyse and output geographically referenced data or geospatial data in order to support decision making for planning and management of land use, natural resources, environment, transportation, urban facilities and other administrative records.<br>**Components of GIS**<br>**1. Hardware-** consists of computer hardware system on which the GIS software runs.<br>**2. Software-** Software refers to the programs that run on computers; these include programs to manage the computer and to perform specific functions.<br>**3. Method or procedure-** A computer system for GIS consists of hardware, software and procedures designed to support the data capture, storage, processing, analysis, modelling and display of geospatial data.<br>**4. Data-** Data is named as geospatial and attributes data in GIS.<br>**5. Users-** there must be people to plan, implement and operate the system as well as to make decisions based on the output. | 1<br><br><br><br>2<br><br><br><br>2 | | |
| | **PART-B** | | | |
| (a) | **Explain** the storage coefficient and permeability. | 5 | K2 Understanding | CO4 |
| Sol | **Storage Coefficient-** is defined as the volume of water that an aquifer releases from or takes into storage per unit surface area of aquifer per unit change in the component of head normal to that surface.<br>**Permeability:** the amount of water that can be held in the soil called "porosity". The rate at which water flows through the soil is known as permeability. | 3<br><br>2 | | |
| (b) | **Write a note** on different methods of artificial recharge of ground water. | 5 | K2 Understanding | CO4 |
| Sol | i) Artificial recharge of ground water: Artificial recharge may be defined as augmenting the natural movement of surface water into underground formations by some method of construction, by spreading of water, or by artificially changing natural conditions.<br>1. Surface method ii) Subsurface Method<br>**1. Surface method**:<br>a) Basin method: water may be recharged by releasing it into basins formed by construction of dikes or levees or by excavation. | 2 | | |

| | | | | |
|---|---|---|---|---|
| | b) Stream channel method: Water spreading in natural stream channel involves operation that will increase the time and area over which water is recharged from a naturally losing channel.<br>c) Ditch and Furrow Method: In this method water is distributed to a series of ditches or furrows that are shallow, flat-bottomed and closely spaced to obtain maximum water contact area.<br>**2. Subsurface Method**: Subsurface techniques are very much useful when there is a low permeability between the ground surface and unsaturated upper level of the recharged aquifer. | 2<br><br><br><br><br>1 | | |
| **(c)** | **Explain** the limitations of remote sensing. | **5** | **K2 Understanding** | **CO5** |
| **Sol** | **Limitations of Remote Sensing**<br>1. The interpretation of imagery requires a certain skill level<br>2. Needs cross verification with ground (field) survey data<br>3. Data from multiple sources may create confusion<br>4. Objects can be misclassified or confused<br>5. Distortions may occur in an image due to the relative motion of sensor and source | **Any 5 points 1x5** | | |
| | **OR** | | | |
| **4(a)** | **Explain** the total hardness of water. | **5** | **K2 Understanding** | **CO4** |
| **Sol** | Hardness is most commonly expressed as milligrams of calcium carbonate equivalent per litre. Water containing calcium carbonate at concentrations below 60 mg/l is generally considered as soft;<br>60–120 mg/l, moderately hard;<br>120–180 mg/l, hard; and<br>more than 180 mg/l, very hard | 3<br><br><br><br>2 | | |
| **(b)** | **Write a note** on cyclones and its effects. | **5** | **K2 Understanding** | **CO4** |
| **Sol** | Cyclone refers to any spinning storm that rotates around a low-pressure center. The low-pressure center is also referred to as the 'eye' of the storm, which is well known for being eerily calm compared with the areas under the spinning 'arms' of the storm.<br>**Effects of Cyclones:**<br>1. Tropical cyclones cause heavy rainfall and landslides.<br>2. They cause a lot of harm to towns and villages, causing severe damage to houses. Coastal businesses like shipyards and oil wells are destroyed.<br>3. They harm the ecosystem of the surrounding region.<br>4. Civic facilities are disturbed.<br>5. Agricultural land is severely affected, especially in terms of water supply and soil erosion. | 2<br><br><br><br>3 | | |
| **(c)** | **Explain** the following: i) Richter scale ii) Focus and Epicentre. | **5** | **K2 Understanding** | **CO5** |
| **Sol** | **i) Richter scale:** It is a measure of the size of an earthquake based on the total amount of the energy released by an earthquake, when the over strained rocks suddenly rebound to cause the given earthquake. The method was first | 3 | | |

| | | | | |
|---|---|---|---|---|
| | used by Charles F. Richter in 1935. Subsequently that scale was improved upon and s presently used internationally for describing the size of an earthquake. The Richter's scale of magnitude in fact, classification on the various shocks in magnitude varying from 1 to 10, and its every successive higher number represents little over 30 fold.<br>**ii) Focus and Epicentre**: Focus: the place or point of origin of an earthquake below the surface of the Earth is termed as its focus or hypocentre.<br>**Epicentre**: the point or place on the surface vertically above the focus of a particular earthquake is termed as its epicentre. It is that place on the surface of the earth where the vibrations from a particular earthquake reach first of all. | 2 | | |

**Course In charge** **Head - Dept** **Principal**