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403 S.2
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65695

Note: Draw neat diagrams where necessary.

Max. Marks 100



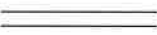
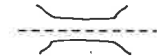



Duration 3 Hrs

1	a	Fill in the blanks i) <u>Contour</u> is a line connecting points of equal elevation. ii) Spirit level and bulls eye level is present in <u>Brunton</u> Compass . iii) Joints due to the cooling of an intrusive rock are <u>younger</u> than the adjacent country rock iv) The study of air photographs and maps constructed from such photographs for geologic information is called photogeology. v) A <u>profile</u> section is a diagram showing the shape of the surface of the land as it would appear in vertical cross section. vi) Symbol $\perp 60^\circ$ on geological map represents _____. vii) <u>Apophyses</u> are extension of an intrusive into the country rock. viii) Pacing is a common method of measuring distance on the ground. ix) Cable drilling, rotary drilling and diamond drilling are _____ type of * geologic surveying	10
	b	Define the following (all units) i) Geologic survey- A geological survey is the systematic investigation of the geology beneath a given piece of ground for the purpose of creating a geological map or model. ii) Traverse- Traverse is a method in the field of surveying to establish control networks. It is also used in geodesy. Traverse networks involve placing survey stations along a line or path of travel, and then using the previously surveyed points as a base for observing the next point iii) Phreatic zone- The phreatic zone, or zone of saturation, is the area in an aquifer, below the water table, in which relatively all pores and fractures are saturated with water. iv) Connate water- Water trapped in the pores of a rock during formation of the rock. The chemistry of connate water can change in composition throughout the history of the rock. v) Aquitard- An aquitard is any geological formation of a rather semipervious nature that transmits water at slower rates than an aquifer. vi) Magma- hot fluid or semi-fluid material below or within the earth's crust from which lava and other igneous rock is formed on cooling. vii) Dip- definition- The angle of inclination of a planar feature measured from a horizontal datum. explanation- The dip measures the angle (inclination) of a planar feature. The dip is measured in a vertical plane that is oriented perpendicular (orthogonal, 90*) to the strike direction. The dip will not be a value greater than 90* viii) clinometer- An instrument for measuring the angle between an inclined surface and the horizontal datum. The clinometer is used to measure the dip of a bedding plane, a cleavage plane, a fault plane, etc.; and the plunge of a lineation, a fold axis, a ripple crest, etc.	10

Q.1a) * Permeability of sandstone is greater than claystone

	<p>ix) Darcy law- Darcy's law states that there is a linear relationship between flow velocity (v) and hydraulic gradient (i) for any given saturated soil under steady laminar flow conditions.</p> <p>x) Altimeter- Image result for altimeter geologyen.wikipedia.org An altimeter is an active instrument used to measure the altitude of an object above a fixed level. The measurement of altitude is called altimetry,</p>	
2	<p>Answer any two of the following</p>	
a	<p>What is the scope of geologic field work? Add note on note taking during field work.</p> <p>Geologic notes should always be full and accurate. Do not rely on your memory. Write down all your observations and impressions. Be careful to distinguish between facts and theories. If you are not quite sure of a statement, punctuate it with a question mark in parentheses. Notes may be abbreviated to save time, use scientific symbols. Strike and dip of bedding may be recorded in short form by always writing them in the same order. Draw cross sections and lithologs. On the last pages of the field notebook the rock specimens and photographs should be separately catalogued.</p>	10
b	<p>What are the various methods of sample collection? Add note on photography on field.</p>	10
c	<p>Identify the labelled parts of the Brunton compass and describe them in detail.</p> <div data-bbox="784 1254 1310 1590" data-label="Diagram"></div>	10
d	<p>Draw the conventional signs and symbols for the following features—</p>	10

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	<p>(i) International Boundary </p> <p>(ii) Bench Mark BM 63.3</p> <p>(iii) Villages </p> <p>(iv) Metalled Road </p> <p>(v) Footpath with bridges </p> <p>(vi) Tidal river </p> <p>(vii) Traingulated station </p> <p>(viii) Lined wells </p> <p>(ix) Post office PO</p> <p>(x) Spring +</p>	
3	<p>Answer any two of the following- (unit 2)</p> <p>a What is groundwater? Explain vertical distribution of ground water.</p> <p>Groundwater is the water found underground in the cracks and spaces in soil, sand and rock. It is stored in and moves slowly through geologic formations of soil, sand and rocks called aquifers</p> <p>Draw neat diagram</p>	10
	<p>b Draw a neat diagram of two basic types of aquifer and explain them in detail.</p> <p><i>Neat diagram showing confined & unconfined aquifer is expected. In confined aquifer perched aquifer is expected. Brief discription of aquifers needed.</i></p>	10
	<p>c How ground water movement is traced? Add note on flow net.</p> <p><i>Brief information about tracers. Diagram of flow net. And diagram with discription.</i></p>	10
	<p>d What are springs? Explain various types of springs.</p> <p><i>Defination of spring. Four diff types of springs</i></p>	10

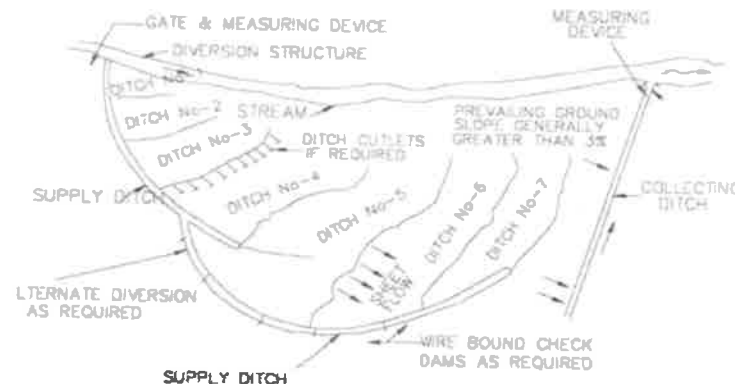
4	Answer any two of the following-(unit 3)	
	<p>a Describe remote sensing method of surface investigation of ground water.</p> <p>Remote sensing techniques indirectly measure hydrological variables, so the electromagnetic variables measured by remote sensing have to be related to hydrological variables empirically or with transfer functions.</p> <p>Remote sensing applications in hydrology that are being used today are mainly in:</p> <ul style="list-style-type: none"> · Precipitation estimation · Runoff computations · Evapotranspiration over land surface · Evaluation of soil moisture content · Groundwater identification and estimation · Hydrological modelling 	10
	<p>b Explain two popular resistivity survey methods for groundwater exploration?</p> <p>Elaborate on Wenner and Schlumberger methods</p>	10
	<p>c Give an account of seismic methods in groundwater exploration.</p> <p>based on the measurement of the travel time of seismic waves refracted at the interfaces between subsurface layers of different velocity.</p> <p>Seismic energy is provided by a source (hammer, weight drop or small explosive charge) located on the surface</p> <p><input type="checkbox"/> The seismic waves travel through the subsurface at a velocity dependent on the density of the soil/rock.</p> <p>When the seismic wave front encounters an interface where seismic velocity drastically increases, a portion of the wave critically refracts at the interface, traveling laterally along higher velocity layers.</p> <p>Due to compressional stresses along the interface boundary, a portion of the wave front returns to the surface</p> <p>Travel time of waves depend on media (greatest in igneous, i.e. consolidated rocks, and least in unconsolidated rocks)</p> <p>O Seismic velocity increases markedly from unsaturated to saturated zone.</p>	10

5

O The acoustic velocity of a medium saturated with water is greatly increased in comparison with velocities in the vadose zone. Thus, the refraction method is applicable in determining the depth to the water table in unconsolidated sediments.

d What is artificial recharge? Explain ditch and furrow method of artificial recharge. 10

Artificial recharge (also known as aquifer re-injection) is the process of injecting



(or recharging)

into the ground in a controlled way,

water

5 Write notes on any four of the following (all units)

20

- i) Discrimination Between Igneous Contacts, Unconformities, and Faults
Characteristic observations pertaining to it with diagrams.
- ii) Plane table survey-The plane table surveying is one of the fastest and easiest methods of surveying. Plotting of plans and field observations can be done at the same time in plane table surveying. It is useful for the following cases: It is best fitted for small-scale surveying i.e. any types of fields.
- iii) Perched Aquifer-A perched water table (or perched aquifer) is an aquifer that occurs above the regional water table, in the vadose zone. This occurs when there is an impermeable layer of rock or sediment (aquiclude) or relatively impermeable layer (aquitard) above the main water table/aquifer but below the land surface
diagram
- iv) Neutron logging-
- v) Flownets- A flownet is a graphical representation of two-dimensional steady-state groundwater flow through aquifers. Construction of a flownet is often used for solving groundwater flow problems where the geometry makes analytical solutions impractical.

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	<p>vi) Induced recharge- The water entering into an aquifer from a stream or body of water as a result of lowering the water table or potentiometric head in an aquifer. Explain the various methods</p> <p>vii) Cone of depression-A cone of depression occurs in an aquifer when groundwater is pumped from a well. In an unconfined aquifer, this is an actual depression of the water levels. In confined aquifers, the cone of depression is a reduction in the pressure head surrounding the pumped well.</p>	
