Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

FACULTY OF APPLIED SCIENCE

M.Sc., Winter 2019-20 Examination

Semester: 3 **Date: 05/12/2019**
Subject Code: 11211205 **Time:02:00 pm to 04:30 pm**
Subject Name: Hydrogeology **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1. A) Essay type/ Brief note (4x2) (Each of 04 marks) **(08)**

(a) Brief note on origin and age of groundwater.

(b) Brief note on Time variations of groundwater levels.

Q.1. B) Answer the following questions (Any two)

(a) Short note/ Brief note (2x2)/ Schematically label the figures (2x2) (Each of 02 marks) **(04)**

1. Brief note on the term Transmissivity employed in groundwater hydraulics.
2. Short note on sea water intrusion in Karst terrains.

(b) Short note on the Geologic methods in surface investigations of Groundwater**.** **(04)**

(c) Short note on Ghyben-Herzberg relation between fresh and saline waters. **(04)**

Q.2. A) Answer the following questions.

(a) Short note/ Brief note (2x2)/ Fill in the blanks. (Each of 02 marks) **(04)**

1. _____ extends from the water table upto the limit of capillary rise of water.
2. Why gravity method has little application to groundwater prospecting?

(c) Short note on structure of fresh-salt water interface. **(04)**

Q.2. B) Answer the following questions (Any two)

(a) Short note/ Multiple choice questions. (Each of 01 marks) **(03)**

1._____is expressed as a ratio of interconnected interstices to the total volume.

(A) Permeability (B) effective porosity

(C) Absolute porosity (D) Intrinsic permeability.

2.The most reliable method for estimating aquifer hydraulic conductivity is by _____.

(A) tracer test (B) Auger hole test

(C) pumping test of wells (D) Laboratory methods

3.Darcy's law is expressed as _____

(A) Q= -KA (dh/dl) (B) Q= K (dh/dl)

(C) Q= -KV (dh/dl) (D) Q= Kh (dA/dl)

(b) Short note on the various types of confining beds with examples. **(03)**

(c) Short note on occurrence of saline water intrusions. **(03)**

Q.3. A) Essay type/ Brief note (4x2) (Each of 04 marks) **(08)**

(a) Brief note on unconfined and confined type of Aquifers.

(b) Brief note on Darcy's law with experimental verification

Q.3. B) Answer the following questions (Any two)

(a) Short note/ Brief note (2x2)/ Schematically label the figures (2x2) (Each of 02 marks) **(04)**

1. Schematically illustrate the vertical divisions of subsurface water.

2. Which are the three conditions in the process of urbanization which disrupts the subsurface hydrologic balance and produce decline in groundwater levels?

(b) Short note on Land subsidence and groundwater **(04)**

(c) Short note on Base flow and base flow recession curve. **(04)**

Q.4. A) Answer the following questions.

(a) Short note/ Brief note (2x2)/ Fill in the blanks. (Each of 02 marks) **(04)**

1. What is the limit of Darcy's law in relation to reynold's number N_R?
2. Which instrument measures the negative pressure head of water within the vadose zone?

(b) Short note on Geological formations as aquifers. **(04)**

Q.4. B) Answer the following questions (Any two)

(a) Short note/ Multiple choice questions. (Each of 01 marks) **(03)**

1. _____ is a periodic thermal spring resulting from the expansive force of superheated steam within constricted subsurface channels.

   (A) Mudpot (B) Fumarole (C) Geysers (D) Gravity springs

2. The marked increase in streamflow in reaches where a subsurface restriction forces groundwater to the surface is called as _____

   (A) Rising water (B) Losing stream (C) Gaining stream (D) Springs

3. _____aquifer possesses hydrologic properties that are everywhere identical.

   (A) Confined (B) Unconfined (C) Homogenous (D) Isotropic

(b) Short note on the general types of gravity springs resulting from water flowing under hydrostatic pressure. **(03)**

(c) Short note on zone of saturation **(03)**