

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00922

December, 2016

ET-532(B) : GROUND WATER DEVELOPMENT

Time : 3 hours

Maximum Marks : 70

Note : Answer any five questions. All questions carry equal marks. Well-labelled sketch shall carry due weightage.

1. (a) Discuss Darcy's Law and its application. Describe the factors affecting the permeability of soil. 7
- (b) With a neat diagram, describe the method to determine hydraulic conductivity in a laboratory. 7
2. (a) Describe the characteristics and mode of formation of basalts. Discuss various factors that influence its hydrological properties. 8
- (b) Differentiate between the following :
 - (i) Unconfined and Confined aquifers 2
 - (ii) Potentiometric level and Water table 2
 - (iii) Pressure head and Ground water potential 2

3. (a) Write down the assumptions for steady flow condition for confined and unconfined aquifers. Write the expression for well yield for these conditions. 10
- (b) Discuss any *two* of the following :
- (i) Cone of depression 2
- (ii) Radius of influence 2
- (iii) Static water level 2
4. (a) Explain remote sensing. Give an account of aerial photographic method of ground water investigation. 8
- (b) Explain through a neatly drawn flow chart the methodology of integrated approach for ground water exploration. 6
5. (a) What is geophysical exploration of ground water ? Explain seismic refraction method of ground water exploration. 8
- (b) Briefly discuss the following subsurface geophysical logging methods :
- (i) Self-Potential Logging 2
- (ii) Resistivity Logging 2
- (iii) Gamma Ray Logging 2
6. (a) Define evapotranspiration. List the different methods to determine it. Explain the energy balance method of determination of evaporation in detail. 7
- (b) Giving a neat sketch, explain hydrological cycle. 7

7. (a) Discuss the concept of conjunctive use of water. Explain its importance in basin management. 8
- (b) Explain the following methods of measurement of recharge :
- (i) Environmental Tritium Method 2
 - (ii) Artificial Tagging Method 2
 - (iii) Hydrothermal Method 2
8. Write short notes on the following :
- (a) Sodium Absorption Ratio $3\frac{1}{2}$
 - (b) Critical Depth of Ground Water $3\frac{1}{2}$
 - (c) Hydrobotanical Investigation $3\frac{1}{2}$
 - (d) Contour Bunding $3\frac{1}{2}$
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