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ET-532(B)

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00540

June, 2016

ET-532(B) : GROUND WATER DEVELOPMENT

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Diagrams/sketches should be neat and well labelled.*

1. (a) What are the main criteria for the selection of a percolation tank ? 7

(b) Describe a subsurface dam using a schematic block diagram. Also explain its working principle. 7

2. (a) In an irrigation project, define the following : 7

(i) Water conveyance efficiency

(ii) Field application efficiency

(iii) Distribution efficiency

(iv) Overall project efficiency

(b) What do you understand by the term watershed development ? Explain the different watershed development techniques. 7

3. (a) Calculate the bulk density of 1 mm diameter particles having a particle density of 2·65 g/cm^3 when packed under cubical arrangement. 7

(b) Describe equipotential lines, stream tubes and flow net in connection with the ground water flow through a representative schematic diagram. 7

4. (a) What is well logging ? Explain any ***three*** of the following : *1+3×2=7*

(i) Resistivity logging

(ii) Gamma-Gamma logging

(iii) Temperature logging

(iv) Neutron logging

(v) Caliper logging

(b) Discuss the behaviour of electrical resistivity in ground water investigations using electrical resistivity meter for a two-layer case with high resistivity layer over a lower resistivity layer. 7

5. (a) Three closely spaced wells are pumped simultaneously. Using a schematic diagram, show their composite drawdown curve. 7

(b) Define the phenomenon of interference of wells. Explain briefly, why in mines and foundations dewatering, wells are closely spaced. 7

6. (a) What is meant by well characteristics ? Describe the procedure of specific capacity determination. 7

(b) Define well efficiency. How is the theoretical drawdown compared with actual drawdown using distance drawdown curve ? 7

7. (a) Show the changes in depth and the radius of the cone of depression at equal time intervals under a constant pumping rate. Use the diagrammatic representation for explanations. 7

(b) How many types of wells are possible in

(i) Confined aquifer,

(ii) Unconfined aquifer, and

(iii) Parched water tables based on the (1) rate of pumping, and (2) recharge conditions. Give only the list. 7

8. (a) What is the purpose and importance of geochemical characterization of ground water ? Discuss any ***two*** methods in detail : 7

(i) Collins bar diagram

(ii) Stiff diagram

(iii) Contour maps

(iv) Piper trilinear diagram

(b) Discuss any ***one*** of the following two methods of computing average rainfall (precipitation) from the watersheds : 7

(i) Isohyetal method

(ii) Thiessen polygon method
