

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: BE
BRANCH: CIVIL**

**SEMESTER : VII
SESSION : MO/19**

SUBJECT: CE7003: IRRIGATION ENGINEERING AND HYDROLOGY

TIME: 3:00 HOURS

FULL MARKS: 60

INSTRUCTIONS:

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
 2. Candidates may attempt any 5 questions maximum of 60 marks.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Differentiate between wild flooding and controlled flooding. [2]
- Q.1(b) What are the advantages of irrigation? [4]
- Q.1(c) After how many days will you supply water to soil in order to ensure efficient irrigation of the given crop if, [6]
- Field capacity = 27 %
Permanent wilting point = 14 %
Dry density of soil = 1.5 g/cm³
Root zone depth = 75 cm
Daily consumptive use of water for the given crop = 11 mm
- Q.2(a) Define the following. [2]
- (i) gross command area, (ii) cultural command area, (iii) culturable cultivated area, (iv) culturable uncultivated area
- Q.2(b) Explain the Blaney-Criddle method of estimation of consumptive use of water. [4]
- Q.2(c) A water course has a culturable command area of 1200 hect. The intensities of irrigation for Crop - A is 40 % and it 35 % for Crop - B. Both the crops are rabi crops. Crop - A has a kor period of 20 days and Crop - B has a kor period of 15 days. Calculate the discharge of water course if the kor depth for Crop - A is 10 cm and for Crop - B it is 16 cm. [6]
- Q.3(a) Describe briefly the classification of canals. [2]
- Q.3(b) Using Lacey's fundamental equations, derive the relationship between velocity, discharge, and silt factor. [4]
- Q.3(c) Using Lacey's method, design an alluvial canal for Q = 30 cumecs, f = 1.0. Assume side slope as $\frac{1}{2} : 1$. [6]
- Q.4(a) With the help of sketch, differentiate between berm and counter berm. [2]
- Q.4(b) Derive the expression for discharge for steady radial flow to a well in an unconfined aquifer. [4]
- Q.4(c) During a recuperation test, the water in an open well was depressed by pumping by 2.5 m and it recuperated 1.8 m in 80 minutes. Find yield from a well of 4 m diameter under a depression head of 3m. [6]
- Q.5(a) Differentiate between storage head work and diversion head work. [2]
- Q.5(b) With the help of a sketch, show the component parts of a diversion head works. [4]
- Q.5(c) Describe briefly different types of cross drainage works. [6]
- Q.6(a) Write the Horton's equation of infiltration. [2]
- Q.6(b) What are different forms of precipitation? [4]
- Q.6(c) Explain the Thiessen polygon method of determination of mean precipitation over an area. [6]
- Q.7(a) What do you understand by rainfall runoff modelling? [2]
- Q.7(b) What are the factors that affect a flood hydrograph? [4]
- Q.7(c) Discuss various methods of estimation of flood. [6]

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