

June 2019

IRRIGATION ENGINEERING*Time Allowed: 3 Hours**Full Marks: 70***Answer to Question No.1 is compulsory and to be answered first.**

**This answer is to be made in separate loose script(s) provided for the purpose.
Maximum time allowed is 45 minutes, after which the loose answer scripts will be collected and
fresh answer scripts for answering the remaining part of the question will be provided.**

**On early submission of answer scripts of Question No.1,
a student will get the remaining script earlier.**

Answer any five questions from the rest.

1. Answer as directed (any twenty):

20x1

Fill in the blanks:

- i) For an Earthen dam piping through the dam is an example of _____ failure.
- ii) An unconfined aquifer is one which _____.
- iii) If the F.S.L. of a canal is sufficiently below the bed level of natural drainage the probable Cross Drainage Work is _____.
- iv) Theissen's Polygon method is a method of _____.
- v) The structure which is constructed for free movement of fishes across a dam is known as _____.
- vi) The first heavy watering for a crop after sowing is known as _____.
- vii) If a canal is aligned along the slope of a contour line the canal alignment is known as _____.
- viii) Water logging increases the _____ in soil.

State whether the following statements are TRUE or FALSE:

- ix) Run off does not depend upon Permeability of soil.
- x) If the velocity of flow of water in a canal is higher than the Critical velocity of flow silting will occur.
- xi) Water for entry in to the canal is collected from the top layer of Still Pool created by Divide wall.
- xii) Canal fall dissipates energy.
- xiii) There is no provision for cross drainage works in case of side slope canals.
- xiv) Flood forecasting may create panic among public, so it is to be avoided.
- xv) There is no good effect of flood.
- xvi) Inlet and outlet is a type of Cross Drainage Works.

Choose the correct answer from the given alternatives:

- xvii) For an Irrigation Project – (a) G.C.A. > C.C.A.; (b) G.C.A. < C.C.A.; (c) G.C.A. = C.C.A.; (d) None of the above.
- xviii) An example of Non Recording type Rain gauge is – (a) Tipping Bucket Type; (b) Weighing Bucket type; (c) Simon's Rain Gauge; (d) None of the above.
- xix) For a weir impounding is not done by – (a) elevated crest; (b) elevated crest and a gate; (c) only by a gate; (d) all the above.
- xx) The causes of failure of Earthen dam may be – (a) Seepage failure; (b) Hydraulic failure; (c) Structural failure; (d) any one of the above.
- xxi) For a canal which has neither effect of silting nor the effect of scouring is known as – (a) Regime canal; (b) lined canal; (c) no silt canal; (d) none of the above.

- xxii) The structure in Head Regulator which is meant for restriction of entry of silt in canal is known as – (a) silt extractor; (b) silt excluder; (c) silt eliminator; (d) silt ejector.
- xxiii) When a canal is aligned along the ridge the canal is known as – (a) Watershed canal; (b) side slope canal; (c) contour canal; (d) lined canal.
- xxiv) When the H.F.L. of natural drainage is above the bed level of canal but below the F.S.L. of canal, the hydraulic structure for cross drainage work is – (a) aqueduct; (b) syphon aqueduct; (c) super passage; (d) canal syphon.
2. a) Name different methods of Irrigation. What are the ill effects of over Irrigation?
 b) Name different types of Recording and Non recording type Rain gauges. Write the factors which affect correct rainfall gauge data collection. <https://www.wbscteonline.com>
 c) Define G.C.A. and Intensity of Irrigation. (2+2)+(2+2)+2
3. a) What is the relationship between duty, delta and base period? With usual notations derive the relationship between them.
 b) What are the factors which affect run off?
 c) What are crop period and base period? (1+4)+3+2
4. a) What is the conception of silting and scouring in a canal? On which factors they depend?
 b) Compare earthen dam and gravity dam with respect to foundation. What are the different modes of failure of earthen dam? (2½+2½)+(2½+2½)
5. a) Write in brief in bullet form the survey work taken up for an Irrigation project.
 b) How the different modes of failure of earthen dam can be restricted?
 c) Define spillway, its function, location and what are its components? 3+4+3
6. a) What is meant by Lift Irrigation? Give examples.
 b) With sketch differentiate between weir and barrage. (2+2)+6
7. a) What are the functions of silt excluder and silt ejector (silt extractor) in canal head regulator?
 b) What is meant by Cross Drainage Works? When the following Cross Drainage Works are required – (i) Aqueduct; (ii) Syphon aqueduct; (iii) Canal Syphon; (iv) Level crossing? 3+1+(1½x4)
8. a) Classify canals according to alignment. What are the advantages of Watershed canal?
 b) What is meant by Watershed Management? Write briefly why it is required. (2+3)+(2+3)
9. a) What is meant by Water logging? What are the ill effects of water logging?
 b) Define flood. What are the causes of flood? (2+3)+(1+4)
10. a) Name different methods of flood control. Define flood control reservoir. What is meant by flood forecasting?
 b) What are the anti water logging measures? What are the curative measures against water logging? (2+2+2)+(2+2)

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