KATHMANDU UNIVERSITY
End Semester Examination [C]
June, 2018

Marks Scored:

Level : B.E.
Year : III

Course : CIEG 304
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date JUN 13 2018

SECTION "A"
[20 Q. × 0.5 = 10 marks]

Multiple Choice Questions, (tick the most appropriate answer).

1. Gravity dams are mostly provided with
   a. Chute spillway b. Ogee Spillway c. Morning Glory d. Tunnel

2. The most critical condition for the stability of slopes in a homogeneous earth dam is
   a. Just after construction b. Reservoir full condition
   c. Sudden draw down condition d. Reservoir empty condition

3. The height of tallest earth dam in the world is
   a. 270 m b. 280 m c. 290 m d. 300 m

4. The water in buttress dam is supported by
   a. Deck b. Buttresses c. Braces d. Hauches

5. In a hydraulic fill dam, the material is carried and placed by
   a. Hand b. Machines c. Pipes d. Wheel barrow

6. The most economical central angle for an arch dam is
   a. 133°34' b. 136°34' c. 140°34' d. 144°34'

7. If the resultant falls outside the outer middle third of the base, the ultimate failure of dam occurs by:
   a. crushing b. overturning c. sliding d. tension

8. Shaft spillways are suitable for
   b. Narrow gorges and steeply rising abutments
   c. Narrow gorges and mildly rising abutments
   d. Wide gorges with steeply rising abutments
   e. Wide gorges with mildly rising abutments

9. If the eccentricity of total self-weight W of a masonry dam at its base is equal to one-fourth of base width B, then the maximum pressure at the base is given by
   a. 2W/3B b. 4W/3B c. 5W/2B d. 8W/3B

10. The height of the tallest earth dam in the world is
    a. 270 m b. 280 m c. 290 m d. 300 m

11. The best design of the arch dam is when
    a. All horizontal water loads are transferred horizontally to the abutments.
    b. The dam is safe against sliding at various levels
    c. The load is divided between the arches and cantilevers and the deflections at the conjugal points being equal
    d. The deflections of the cantilevers are equal at different points

12. Morning glory spillway is another name of
    a. Tunnel spillway b. Syphon spillway c. Shaft spillway d. Chute spillway

13. Overtopping of dam is caused by.....failure
    a. seepage b. structural c. earthquake d. hydraulic

14. Tail water pressure, in a gravity dam, helps in
    a. overturning b. sliding c. stability d. uplift

15. Buttresses are provided at ..... angle to the axis of the dam.
    a. 0° b. 30° c. 60° d. 90°

16. The phenomenon of piping under an earthen dam starts at the
    a. heel b. toe c. u/s face d. d/s face

17. the materials which are unsuitable for any zone of the dam are
    a. clays b. fine silts c. sands d. gravels

18. A check dam is a
    a. Flood control structure
    b. Soil conservation structure
    c. River training structure
    d. Water storage structure

19. A constant center (inplan view) arch dam is best suited for
    a. A V shaped gorge
    b. A U shaped gorge
    c. Both U – shaped and V shaped gorge
    d. Multi-peaked gorges

20. Flow net in a dam is a graphical method to determine
    a. Velocity of flow
    b. Phreatic line
    c. Discharge through the dam
    d. Pore pressure

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SECTION "B"

Attempt *ALL* questions.

1. Write about the two dimensional analysis of gravity dam. [8]

2. What are the different causes of failure of earthen dam? Explain. [8]

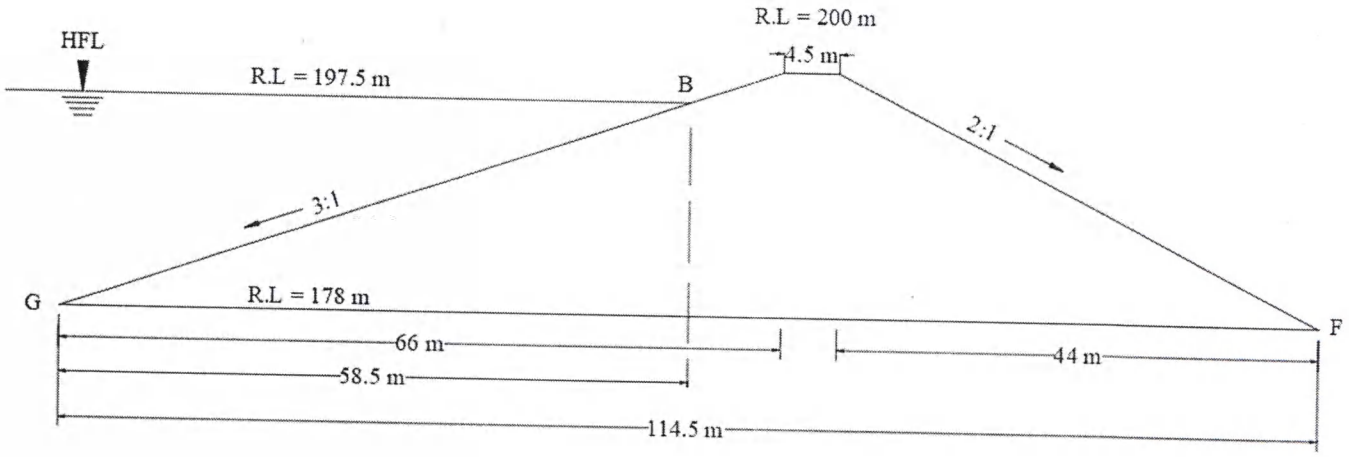
3. Explain the different factors governing selection of type of dam. [3]

4. Write about the layout of the gravity dam. [5]

5. An earthen dam made of a homogeneous material has the following data:

Coefficient of permeability of dam material	$= 5 \times 10^{-4}$ cm/sec
Level of top of dam	= 200 m
Level of deepest river bed	= 178 m
H.F.L of reservoir	= 197.5 m
Width of top of dam	= 4.5 m
Upstream Slope	= 3:1
Downstream slope	= 2:1

Determine the phreatic line for this dam section and the discharge passing through the dam [8]



6. A masonry dam 10 m high is trapezoidal in section with top width of 1 m and bottom width of 8.25 m. The face exposed to water has a batter of 1:10. Calculate:
(i) Factor of safety against overturning
(ii) Factor of safety against sliding
(iii) Shear friction factor
Assume coefficient of friction as 0.75, unit weight of masonry as 2240 kg/m^3. Permissible shear stress of joint = 14 kg/cm^2. Based on the results give your remarks. [8]