KATHMANDU UNIVERSITY
End Semester Examination
February/March, 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 : MAR 1 6 2018

SECTION "A"
[20 Q.×0.5=10 marks]

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

1. An arch dam is:
   a. Concave u/s b. Convex u/s c. Convex d/s d. Vertical

2. Buttress dams are also termed:
   a. Massive arch dams b. Solid gravity dams
   c. Hollow gravity dams d. Multiple arch dams

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 most disastrous effect of inadequate spillway capacity is on:
   a. Gravity dams b. Arch dams
   c. Buttress dams d. Earth and Rockfill dams

5. An arch dam is economical because:
   a. Its base is narrow b. Materials used are locally available
   c. Strength of materials is fully developed d. Weight imparts strength

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

7. Related to zoned earth dams, select the wrong statement.
   a. u/s shell is made of relatively pervious material
   b. core is made of pervious soil
   c. d/s shell adds to the stability of the dam
   d. d/s shell is made of coarse material

8. Chute spillway is also called:
   a. Side channel spillway b. Open channel spillway
   c. Tunnel spillway d. Syphon spillway

9. Hydraulic height of the dam is the difference in elevation of ..... from the lowest point in river bed:
   a. MWL b. FRL c. LWL d. Crest level

10. An elementary profile of a gravity dam is ..... in cross section.
    a. rectangular b. upstream face vertical with broad crest
    c. triangular d. u/s face fully inclined

11. The base parabola starts from a point ..... m, where m is the horizontal distance between the heel and the intersection of u/s slope with the reservoir level.
a. 0.2 b. 0.3 c. 0.4 d. 0.5

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

13. Uplift pressure can be reduced by carrying out:
a. Curtain grouting near heel b. Curtain grouting near toe
c. Consolidation grouting near heel d. Consolidation grouting near toe

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

15. An arch dam transfers the water load:
a. Horizontally on foundation b. Vertically on foundation
c. Vertically on abutments d. Horizontally on abutments

16. The surface of the rupture in circular arc method is considered to be:
a. elliptical b. parabolic c. cylindrical d. cubical

17. The minimum base width for an elementary profile with reservoir full and uplift pressure is given by:
a. $\frac{H}{\rho - 1}$ b. $\frac{H}{\sqrt{\rho - 1}}$ c. $\frac{\sqrt{H}}{\rho - 1}$ d. $\frac{\sqrt{H}}{\sqrt{\rho - 1}}$

18. Chute and Ogee spillways are commonly adopted for:
a. Gravity dams b. Arch dams
c. Earth & Rockfill dams d. Buttress dams

19. Commonly used earth dam is:
a. Homogeneous dam b. Rolled fill dam
c. Hydraulic fill dam d. Zoned dam

20. For a minimum volume of concrete, the best type of an arch dam is:
a. Constant radius b. Constant central angle
c. Variable radius d. Variable radius and angle

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Time : 2 hrs. 30 mins.

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F.M. : 40

SECTION "B"

Attempt *ALL* questions.

1. What is an elementary profile of a gravity dam? Derive an expression for determining base width of such dam based on stress and sliding criterion. Also derive the expressions for normal, principal and shear stresses at the base of the dam. [8]

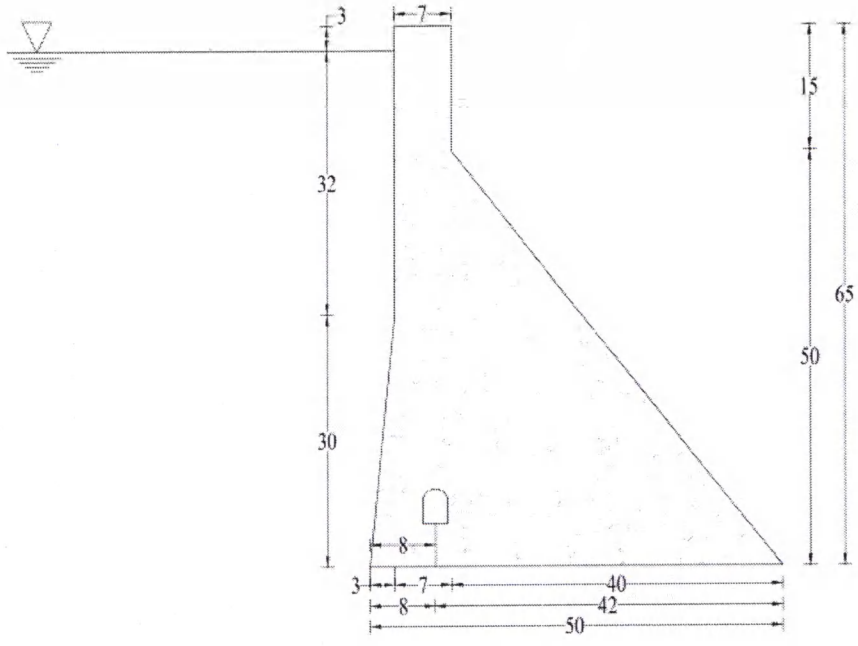
2. How will you prepare an area for the construction of the dam in initial phase? Explain.[5]

3. What are the different modes of failure of gravity dam? Explain the criteria for structural stability of gravity dams. [5]

4. What are the different methods of construction of earthen dams? Explain. [3]

5. Design a constant radius arch dam by the thin cylinder theory for a valley 60 m wide at the base and 90 m wide at a height of 60 m. Take the height of the dam as 60 m. Assume a thickness of 2 m at the top. Take allowable stress in concrete as 5MPa. [5]

6. Check the stability of gravity dam shown in the figure below for reservoir full condition. All dimensions are in m unless otherwise specified. [8]



7. Write short notes on any *TWO*. [2×3=6]

a. Joints in gravity dams
b. Chute Spillway
c. Constant angle arch dam
d. Fish ladder