KATHMANDU UNIVERSITY
End Semester Examination
February/March 2018

Marks Scored:

Level : B. E./B. Tech.
Year : II
Course : CIEG 201
Semester : I
Exam Roll No. :
Time: 30 mins.
F. M. : 10
Registration No.:
Date : MAR 1 1 2018

SECTION "A"
[20 Q × 0.5 = 10 marks]

Tick (√) the most appropriate answer.

1. The property of metals because of which they can be transformed into different shapes by heating is called:
[a] Malleability [b] Ductility [c] Flow ability [d] Resilience

2. Chemically, Marble is a type of:
[a] Sedimentary rock [b] Argillaceous rock [c] Calcareous rock [d] Siliceous rock

3. Pick up the constituent of good brick earth whose excess causes the raw bricks shrink and warp during drying and burning, from the followings:
[a] Alumina [b] Lime [c]Iron oxide [d] Magnesia

4. The main ingredient of a good quality brick earth is:
[a] Magnesia [b] Lime [c] Silica [d] Alumina

5. Strength of cement concrete primarily depends upon:
[a] Quality of water [b] Quantity of aggregate
[c] Quantity of cement [d] Water–cement ratio

6. A badly mixed cement concrete results in:
[a] Segregation [b] Bleeding [c] Honey combing [d] Hydration

7. Age of a tree may be ascertained by:
[a] Radius of its stem [b] Circumference of its stem
[c] Number of branches [d] Number of annual rings

8. Seasoning of timber is done for:
[a] Increasing moisture [b] Decreasing moisture content
[c] Increasing strength of timber [d] Decreasing warping

9. Efflorescence in cement is caused due to excess of:
[a] Silica [b] Lime [c] Al:kalies [d] Iron oxide

10. Which of the following cements is expected to have the highest compressive strength after 3 days?
[a] Ordinary Portland cement [b] Rapid hardening cement
[c] High alumina cement [d] Sulphate resisting cement

11. The admixture added at the time of preparing the concrete mix to reduce the quantity of water and produce high strength concrete is known as:
[a] Retarding admixture [b] Accelerating admixture
[c] Air- entraining admixture [d] Super plasticizers

12. Slump test of concrete is measure of its:
[a] Impact value [b] Consistency [c] Tensile strength [d] Compressive strength

13. According to ISI the concrete gains full strength after:
[a] 14 days [b] 21 days [c] 28 days [d] 35 days

14. Water cement ratio may be defined as the ratio of:
[a] Volume of water to that of cement in concrete mix
[b] Weight of water to that of cement in concrete mix
[c] Volume of water to that of concrete in concrete mix
[d] Weight of water to that of concrete in a concrete mix

15. For water cement ratio of 0.6, the water content per bag of cement is:
[a] 20 kg [b] 30 kg [c] 40 kg [d] 50 kg

16. Which material will have highest limiting strength?
[a] Aluminium [b] Cast iron [c] Mild steel [d] Wrought iron

17. For filling cracks in masonry structures, the type of bitumen used is:
[a] Cut- back bitumen [b] Bitumen- emulsion
[c] Blown bitumen [d] Plastic bitumen

18. The initial and final setting times of quick setting cement are:
[a] 15 minutes and 45 minute [b] 20 minutes and 1 minutes
[c] 10 minutes and 30 minutes [d] 5 minutes and 30 minutes

19. Which one of the following does not belong to exogenous tree?
[a] Coconut [b] Teak [c] Shisham [d] Sal

20. The workability of concrete can be improved by:
[a] More sand [b] More cement
[c] More fine aggregate [d] Fineness of coarse aggregate

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SECTION "B"

Assume the suitable data wherever necessary. Attempt *ALL* questions.

1. a. Briefly explain the functions of constituents of brick earth. [2]
   b. Explain the stress- strain relationship of non-linear elastic material concrete. [2]
   c. How the strength of concrete is affected by the physical and mechanical properties of aggregate? Explain in detail. [2]

2. a. Explain the effects of capillary action during the hydration of cement. [2]
   b. How is the volume of concrete altered in an hour, in a day, in a month and in a year immediately after casting the cubes? [2]
   c. Explain the effects of time and temperature on the strength of concrete. [2]

3. a. How do you increase the durability of construction materials, if the condition of the material is given in such a way that, (i) the timber is well seasoned? (ii) timber containing 200% of moisture of the well-seasoned timber? [3]
   b. Define maturity of concrete. A laboratory experiments conducted at "Kathmandu University" (Dhulikhel), on a particular mix showed a strength of 36 MPa for fully matured concrete. Find whether formwork can be removed for an identical concrete placed at "Pokhara" at the age of 15 days, when the average temperature is 5 °C. The concrete is likely to be subjected to a stripping stress of 29.0 MPa. The coefficient A and B at strength after 28 days, 18 °C (maturity concrete of 19800°Ch) is 32 and 54 respectively. [3]

4. a. How do you explain whether the strength of concrete is decreased or increased, if the reaction starts with the siliceous minerals in the aggregate by the alkaline hydroxide (K_2O and Na_2O) in the cement? [1.5]
   b. Explain the modern method of manufacturing of cement for ordinary Portland cement. [2.5]
   c. What are the different methods which are used to make the hydration of cement continuous for a slab casted before 24 hours, explain in detail. [2]

5. a. Define Abram's law. How is the workability of concrete measured? Explain taking compaction factor test as a reference. [1+2]
   b. Explain the field testing of brick earth. [3]

6. a. Explain the factor affecting the choice of mix proportions. [2]

b. Using IS Method design a concrete mix for reinforced concrete structure using Ordinary Portland cement of grade 43 with 28 days strength 51 N/mm^2, if the super plasticiser is used as a chemical admixture and the Characteristic compressive strength of the concrete is 40 N/mm^2, (Design for pumpable concrete with fly ash)
Maximum nominal size of aggregates = 20 mm(Crushed Angular, Zone-II)
Minimum cement content = 320 kg/m^3
Maximum cement content = 450 kg/m^3
Workability =100 mm (slump)
Sp. gravity of Coarse aggregate = 2.68
Exposure Condition = Severe
Degree of supervision = Good
Sp.gravity of fly ash = 2.2
Sp. gravity of fine aggregate = 2.66
Entrapped air = 2% [4]

7. Write short notes on *ANY TWO* of the followings: [2+2]
   a. Defects in timber
   b. Asphalt & Bitumen with their properties
   c. Types of tiles