KATHMANDU UNIVERSITY
End Semester Examination
May/June, 2022

Marks Scored:

Level : B.Arch.
Year : I

Course : ARCH 161
Semester : II

Exam Roll No: Time: 30 mins. F. M. : 10

Registration No.: Date :

SECTION "A"
[20Q × 0.5 = 10 marks]

Encircle the most appropriate answer.

1. Power showed that the strength of concrete bears a specific relationship with the gel/space ratio. He found the relationship to be_____.
   a. $140x^3$ b. $240x^2$ c. $240x^3$ d. $140x^2$

2. What happens if bulking is not accounted for while preparing concrete?
   a. Concrete gets hardened b. Concrete is not affected
   c. Concrete gets softened d. Concrete becomes watery

3. The compressive strength of 100 mm cube as compared to 150 mm cube is always
   a. Less b. More c. Equal d. None of these

4. Advantage of a clamp compared to a kiln for burning bricks is that
   a. It takes less time for burning
   b. It gives more output of first class bricks
   c. It has less initial cost
   d. It is suitable when bricks are required in large numbers

5. In stone masonry, the stones are placed in position such that the natural bedding plane is
   a. Normal to the direction of pressure they carry
   b. Parallel to the direction of pressure they carry
   c. At 45° to the direction of pressure they carry
   d. At 60° to the direction of pressure they carry

6. Lime is considered to be hydraulic lime when it sets under water within
   a. 2 to 5 days b. 7 to 30 days c. 2 to 3 months d. 3 to 6 months

7. Specific gravity of a good stone suitable for structural purposes:
   a. should not less than 1.5 b. should not less than 2.7
   c. should not be more than 5.0 d. should be equal to 1.6

8. Which of the following statements is **CORRECT**?
   a. Excess of alumina in the clay makes the brick brittle and weak.
   b. Excess of alumina in the clay leaves high power deposit on the brick.
   c. Excess of alumina in the clay improves impermeability and durability of the brick.
   d. Excess of alumina in the clay makes the brick crack and warp on drying.

9. The increased cohesiveness of concrete, makes it
   a. Less liable to segregation b. More liable to segregation
   c. More liable to bleeding d. More liable for surface scaling in frosty weather

10. The quick lime as it comes from kiln is called _____.
    a. Milk lime b. Hydrated lime c. Lump lime d. Hydraulic lime

11. Quick setting cement is produced by adding
    a. Less amount of gypsum in very fine powdered form
    b. More amount of gypsum in very fine powdered form
    c. Aluminum sulphate in very fine powdered form
    d. Pozzolana in very fine powdered form

12. Which of the following statement is **CORRECT**?
    a. Gypsum in cement decreases the setting time
    b. The first compound of cement which reacts with water is C_2S
    c. Bulking of sand is less when its particles are fine
    d. All options are correct

13. If 50 kg of fine aggregates and 100 kg of coarse aggregates are mixed in a concrete Whose water cement ratio is 0.6, the weight of water required for harsh mix is
    a. 8 kg b. 10 kg c. 12 kg d. 14 kg

14. If 1500 g of water is required to have 1875 g cement paste of normal consistency, the percentage of water is
    a. 20% b. 25% c. 30% d. 35%

15. Identify the process responsible for the formation of sedimentary rocks.
    a. solidification of molten mass of silicates below or at the surface of the earth
    b. changes in texture or mineral composition or both of igneous and sedimentary rocks due to high temperature and heavy pressure
    c. deposited layers of sand and silt subjected enormous overburden pressures over geological times
    d. none of the above

16. You are asked to construct a massive dam, the type of cement you will use is
    a. Ordinary Portland cement b. Low heat cement
    c. Rapid hardening cement d. Blast furnace slag cement

17. The portion of the brick without a triangular corner equal to half the width and half the length is called _____.
    a. King closer b. Closer c. Queen closer d. Squint brick

18. Which one of the following aggregates gives maximum strength in concrete?
    a. Rounded aggregate b. Elongated aggregate
    c. Flaky aggregate d. Cubical aggregate

19. High early strength cement is used for
    a. Hot weather concreting. b. Mass concreting.
    c. Cold-weather concreting d. Warm-humid weather concreting

20. A sample of concrete is prepared by using 500 g of cement with water cement ratio of 0.55 and 240 N/mm^2 intrinsic strength of gel. The theoretical strength of concrete on fully hydration will be nearly_____.
    a. 148 N/mm^2 b. 126 N/mm^2 c. 82 N/mm^2 d. 104 N/mm^2

KATHMANDU UNIVERSITY
End Semester Examination
May/June, 2022

Level : B.Arch.
Year : I
Time : 2 hrs. 30 mins.

Course : ARCH 161
Semester : II
F. M. : 40

SECTION "B"

Attempt ***ALL*** Questions. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

1. Explain briefly the harmful ingredient in good brick earth, stating their effects on the properties of the brick. Explain the methods of manufacturing of bricks and give comparison between two. [2+4]

2. Explain the importance of construction materials considering in the field of Architecture. Explain the purpose of seasoning and preservation of stones. Explain the different methods of quarrying of stones starting with their site selection. [1+2+3]

3. What do you understand by initial setting time and final setting of cement? How the knowledge of these two times does help an engineer in construction work? Explain in detail. How will you determine the compressive strength of cement? Explain briefly with experimental procedure. [3+3]

4. How the bulking of sand is differing with the different percentage of moisture content, explain in detail showing graph? Explain the manufacturing process of lime with schematics diagram. [2+4]

5. Explain the gel /space ratio stating the relation with the strength of concrete? How the volumetric change in concrete occurs due to the impact of aggregate, water cement ratio, member size and Medium Ambient conditions on shrinkage of concrete. [2+3]

6. Explain the stress- strain relationship of non-linear elastic material concrete with neat sketch. Enlist the tests which are commonly employed to measure the workability of concrete. Describe the factor affection the workability of concrete stating their effects to the strength of concrete. [3+3]

7. Write short notes on *(ANY TWO)*: [2Q. × 2.5 = 5]
   a. Describe C-S-H gel
   b. ITZ
   c. Creep of concrete.