

KATHMANDU UNIVERSITY
End Semester Examination
January/February 2024

Marks Scored:

Level : B.Tech.
Year : II

01 FEB 2024

Course : CIEG 201
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date :

SECTION "A"
[20Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate option from each set of choices.

- Most Suitable aggregates to be used in construction process is
 - Angular aggregates
 - Irregular aggregates
 - Flaky aggregates
 - Elongated aggregates
- What is the primary purpose of using Aluminium in construction?
 - Enhanced Fire Resistance
 - Lightweight corrosion resistance and durability
 - Improved Insulation
 - Rapid construction
- As specified in IS 2386 (Part IV): 1963, which of the following set of sieves are used to find the Aggregate Impact Value
 - 12.5mm, 10mm, 2.36mm
 - 12.5mm, 10mm, 4.75mm
 - 20mm, 12.5mm, 10mm
 - 6.3mm, 10mm, 12.5mm
- The ratio of nominal mix for M15 grade of concrete is
 - 1: 1.5:3
 - 1:2:4
 - 1:3:6
 - 1:1:2
- The standard Size of brick available in Nepal according to NBC (Nepal Building Code) in mm is
 - 230×110×75
 - 240×115×57
 - 240×110×55
 - 270×110×55
- Air seasoning of timber is done up to
 - 1 year
 - 2-year
 - 2-to-4-year
 - 2 to 3 year
- In which stage is cement saturated?
 - Hydration stage
 - Colloidisation stage
 - Crystallisation stage
 - None of these
- Air seasoning dries about..... percentage of moisture from wood.
 - 10
 - 15
 - 20
 - 50

9. Which of the following statements is **TRUE** for concrete?
- The strength increases with increase in water cement ratio
 - The strength increases with increase in fineness of cement
 - The strength increases with decrease in curing time
 - The strength increases with decrease in size of aggregates
10. The initial strength in cement is contributed by:
- Dicalcium silicate.
 - Tricalcium silicate
 - Tricalcium aluminate
 - Tetra calcium alumina ferrate.
11. The size of medium sand is
- 0.5mm – 0.025mm
 - 0.5mm – 0.25mm
 - 0.4mm – 0.5mm
 - 0.3mm – 0.4mm
12. What is the specific gravity of OPC 53 grade cement used in laboratory?
- 3.14
 - 3.15
 - 3.16
 - 3.12
13. What component causes yellowish stain in bricks?
- Magnesia
 - Iron Oxides
 - Alumina
 - Silica
14. The number of bags of cement (50 kg) required per cubic meter for M30 grade of concrete is _____
- 8
 - 6
 - 10
 - 12
15. What is the purest form of iron?
- Cast Iron
 - Wrought Iron
 - Pig Iron
 - Steel
16. Which Bouge's compound has highest heat of evolution?
- Dicalcium silicate.
 - Tricalcium silicate
 - Tricalcium aluminate
 - Tetra calcium alumina ferrate
17. In flaky aggregates, the least dimension is less than of the least dimension
- 1/3
 - 2/3
 - 3/5
 - 2/5
18. In which phenomenon of Aggregate there is Dedolomitization, the breaking down of dolomite?
- ASR
 - ACR
 - Both a & b
 - Bulking
19. The resistance to wearing of aggregate is measured by
- Los-Angeles abrasion test
 - Aggregate impact value test
 - Sieve analysis
 - Compressive strength test
20. The range of particle of fine aggregate is
- 0.075mm to 4.75mm
 - 0.06mm to 4.75mm
 - 0.02mm to 8.75mm
 - 0.06mm to 8.75mm

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Level : B.Tech.
Year : II
Time : 2 hrs. 30 mins.

07 FEB 2024

Course : CIEG 201
Semester : II
F.M. : 40

SECTION "B"
[8Q × 5 = 40 marks]

Attempt *ALL* questions.

1. Differentiate between Cast Iron and Wrought Iron. Describe in brief the properties of mild steel and its uses. Describe the process of Annealing with its purpose. [1.5+1.5+2=5]
2. What are the constituents of brick? Describe in brief. Describe in brief the types of bonds in Brick masonry. [2.5+2.5 = 5]
3. Describe about the Alkali-Silica reaction. What are the Various stages of manufacture of concrete? What is the role of admixture in concrete? [1.5+2+1.5=5]
4. Briefly describe about the types and processes of preservation of timber. Draw a neat sketch of the cross-section of timber with proper labels of its layers. Mention the types of commercial woods. [2.5+1.5+1=5]
5. What is the workability of concrete? How is it measured in the laboratory? Explain about the components in a concrete mix in brief. [1+2+2=5]
6. What are the roles of Dicalcium Silicate in cement? Describe the procedure of the standard test for the consistency of cement in laboratory. Mention the hydration reactions that occurs in hydration of cement. [1.5+2+1.5=5]
7. Describe briefly about the physical properties of aggregates. How is the toughness of aggregate measured in the laboratory? Describe Briefly. [3+2=5]
8. Design a concrete mix having a characteristic compressive strength of 48.25 N/mm² at 28 days. The type of cement is OPC 43 grade. Use Indian standards for the design. The maximum size of angular aggregates is 20mm in Saturated Surface dried (SSD) conditions. The workability is measured as 100mm while the method of concrete placing is by pumping. The exposure condition is severe. Take the specific gravity of cement, coarse aggregate and fine aggregate are 3.15, 2.72 and 2.66 respectively. The zone of sand falls on Zone-I of IS-383:1970. The minimum cement content and maximum water-cement ratio are 360 kg/m³ and 0.40 respectively. The admixture used is fly ash confirming to IS 3812, of specific gravity 2.2 and the chemical admixture is super plasticizer confirming to IS 9103. Assume the standard deviation to be 5.0 N/mm² and the amount of entrapped air as 2%. Water absorption of Coarse aggregate and fine aggregates are 0.5% and 1% respectively. The other required data can be assumed accordingly. [5]

Mix design Tables:

Table 2 Maximum Water Content per Cubic Metre of Concrete for Nominal Maximum Size of Aggregate
(Clauses 4.2, A-5 and B-5)

Sl No.	Nominal Maximum Size of Aggregate mm	Maximum Water Content ¹⁾ kg
(1)	(2)	(3)
i)	10	208
ii)	20	186
iii)	40	165

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate
(Clauses 4.4, A-7 and B-7)

Sl No.	Nominal Maximum Size of Aggregate mm	Volume of Coarse Aggregate ¹⁾ per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
		Zone IV	Zone III	Zone II	Zone I
(1)	(2)	(3)	(4)	(5)	(6)
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

