KATHMANDU UNIVERSITY
End Semester examination
May/June, 2022

Marks Scored:

Level : B.E.
Year : II

Course : CEEG 201
Semester : II

Exam Roll No :

Time: 30 mins

F.M : 10

Registration No:

Date :

SECTION "A"
[20 Q × 0.5 = 10 Marks]

Encircle the most appropriate option.

1. The shoulder provided along the road edge should be
   a. rougher than the traffic lanes
   b. smaller than the traffic lanes
   c. of same color as that of the pavement
   d. of very low load bearing capacity

2. In hill roads the side drains are provided
   a. only on the opposite side of hill
   b. on both sides of road
   c. across the road
   d. only on the hill side of road

3. The double mass curve method is used to determine the
   a. intensity of rainfall
   b. number of required rain gauges
   c. consistency of rainfall record
   d. average rainfall

4. Thiessen polygons are drawn by
   a. joining rain gauge stations
   b. drawing perpendiculars of lines joining rain gauge stations
   c. drawing lines of equal elevations
   d. drawing lines of equal precipitation depth for a given duration

5. Evapotranspiration is measured in the field by
   a. Lysimeter
   b. Ring infiltrometer
   c. Class A pan
   d. Anemometer

6. Portion of dam in contact with ground at downstream side is
   a. Crest b. Toe c. Foot d. Heel

7. Earthen dam are _____ in shape.
   a. Triangular b. Rectangular c. Trapezoidal d. Circular

8. Triangular weir is also called
   a. Trigonometric b. Ogee c. Isolated d. V-notch

9. A truss is determinate if
   a. $m + r = j$ b. $m - r = 2j$ c. $m + r < 2j$ d. $m + r = 2j$

10. The point of contra flexure is the point where
    a. Bending moment changes sign
    b. Bending moment is maximum
    c. Bending moment is minimum
    d. Shear force is zero

11. Arrange drill and blast method of excavation cycle in the order of occurrence
    I. Mucking II. Charging III. Dumping IV. Blasting V. Drilling
    a. I, II, III, IV, V
    b. V, II, IV, I, III
    c. III, IV, I, II, V
    d. II, III, IV, V, II

12. Irrigation canals are generally aligned along
    a. Ridge line b. Valley line c. Straight line d. Contour line

13. The difference in level between the top of a bank and supply level in a canal is called ...
    a. Berm b. Free board c. Height of bank d. High flood level

14. The number of independent equations to be satisfied for static equilibrium of a plane structure is
    a. 1 b. 2 c. 3 d. 6

15. The walls which are necessary on the hillside of roadway where earth has to be retained from slipping is known as
    a. Retaining wall b. Breast wall c. Parapet wall d. Boundary wall

16. Bottom most layer of pavement is known as
    a. Subgrade b. Sub-base c. Base course d. Wearing course

17. Coefficient of friction is less when the pavement surface is
    a. Rough b. Dry c. Smooth and dry d. Smooth and wet

18. Which type of spillway is least suitable for earthen dam?
    a. Side channel spillway
    b. Emergency spillway
    c. Ogee spillway
    d. Chute spillway

19. The information which cannot be included in drawings is conveyed through
    a. Gantt chart b. Cover note c. Progress chart d. Specification

20. The expenses of items which do not come under any regular head of items and the cost of unforeseen items are called
    a. Lump sum b. Contingencies c. Extras d. Customary charges

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Time : 2 hrs. 30 mins.

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

SECTION "B"

Attempt *ALL* questions. Make suitable assumptions wherever needed.

1. Explain rational method of flood estimation. Write down its applications. [1.5+1.5]

2. Differentiate between (*ANY THREE*): [3 × 2 = 6]
   i. Infiltration and evapotranspiration
   ii. RMR and Q method
   iii. Rock mass and intact rock
   iv. Surface and sprinkler irrigation

3. Explain the types of gate with neat sketches provided in hydraulic structure. [4]

   OR

   Explain the various types of spillway with neat sketches provided in hydropower.

4. A small catchment of 120 ha area received a rainfall of 10.5 cm in 90 minutes due to a storm. At the outlet of the catchment, the stream draining the catchment was dry before the storm and experienced a runoff lasting for 8 hours with an average discharge of 2 m^3/s. The stream was again dry after the runoff event. [2+1]
   a. What is the amount of water which was not available to runoff due to combined effect of infiltration, evaporation and transpiration?
   b. What is the ratio of runoff to precipitation?

5. Calculate the stopping sight distance on a highway at a descending gradient of 2.5 % for design speed of 80 Kmph. Assume the necessary data suitably. [3]

6. Prepare the rate analysis of one cubic meter of plain cement concrete in the ratio of 1:3:6 [3]

7. Using the method of Joints, find the forces in members of the truss shown in Figure 1. [5]

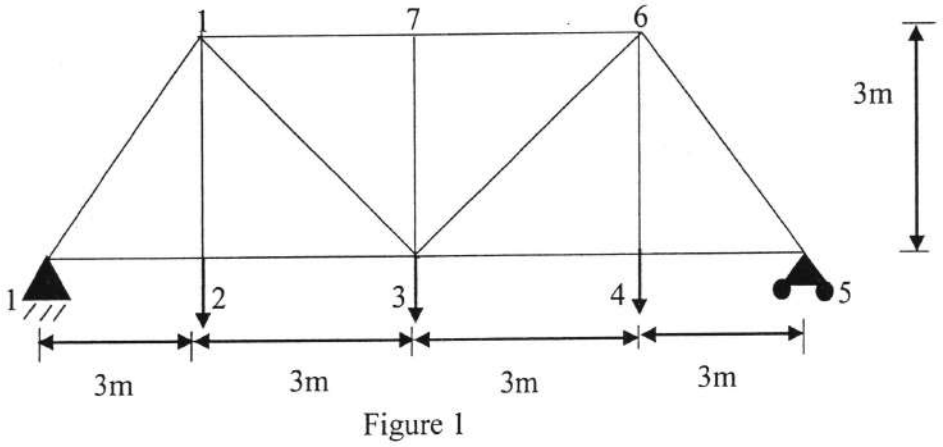


Figure 1

8. Draw SF and BM diagrams for beam loaded with load as shown in **Figure 2**. [6]

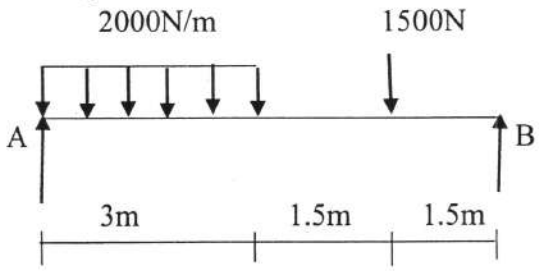
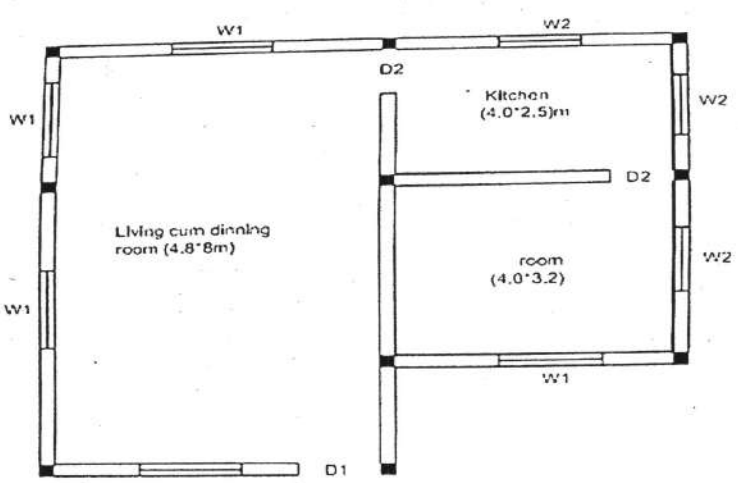
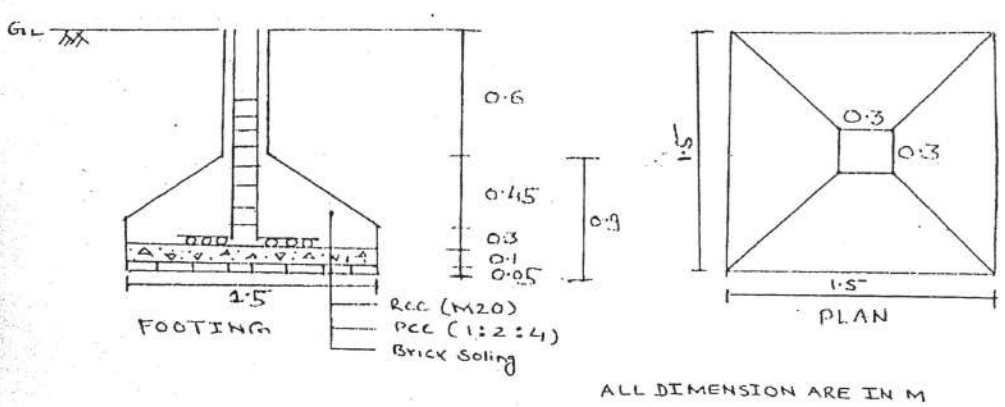


Figure 2

9. Estimate the quantity of following items of work from the given drawings [1+1+1+2+2]
   a. Earth work
   b. Flat brick soling
   c. PCC
   d. Brick work in super structure
   e. RCC work in foundation



Column size = 0.3 x 0.3 m
D1 = 1.2 x 2.1 m
D2 = 0.9 x 2.1 m
W1 = 1.5 x 1.5 m
W2 = 1.2 x 1.5
Wall thickness = 0.23 m



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SECTION "A"
[20Q. × 0.5 = 10 marks]

Choose and mark [×] in the most appropriate option.

1. A culture medium which exact composition is not known is called
[ ] synthetic media [ ] complex media [ ] defined media [ ] natural media

2. The size of typical eukaryotic cell is
[ ] 10 – 20 µm [ ] 0.1 – 0.2 µm [ ] 100 – 200 µm [ ] 1 -2 µm

3. Which of the following is **NOT** a reducing agent?
[ ] sucrose [ ] amylose [ ] lactose [ ] maltose

4. Which of the following is the **CORRECT** statement about phosphodiester linkage between adjacent nucleotide in nucleic acid?
[ ] 3'- phosphate of one nucleotide joins 3'-hydroxy of the next nucleotide
[ ] 3'-phosphate of one nucleotide joins the 5'-hydroxyl of the next nucleotide
[ ] 5'-phosphate of one nucleotide joins the 5'-hydroxyl of the next nucleotide
[ ] 5'-phosphate of one nucleotide joins the 3'-hydroxyl of the next nucleotide

5. Which of the following enzymes has highest turnover number?
[ ] p450 [ ] fumarase [ ] catalase [ ] β-lactamase

6. Which category of enzyme belongs to class two in the international classification?
[ ] hydrolases [ ] ligases [ ] transferases [ ] isomerase

7. Enzyme _____ contains Zinc (Zn) ion.
[ ] carboxypeptidase [ ] phosphorylase B kinase
[ ] tyrosine hydrolase [ ] phosphodiesterase

8. Acetyl CoA is formed from pyruvate by _____reaction.
[ ] dehydration [ ] reduction [ ] oxidation [ ] decarboxylation

9. Which of the following reaction in Krebs cycles does FAD reduced?
[ ] isocitrate to oxaloacetate [ ] succinyl CoA to succinate
[ ] fumarate to malate [ ] succinate to fumarate

10. The metabolic function of the pentose phosphate pathway is
[ ] act as a source of ADP biosynthesis
[ ] generates NADPH and pentose for the biosynthesis of fatty acids and nucleic acid
[ ] provide intermediate for TCA cycle
[ ] synthesize phosphorous pentoxide

Fill in the blank by most appropriate VALUE or WORD.

11. In linoleic acid, the double bonds will be placed between _____.

12. NAD^+ associates with the enzyme lactate dehydrogenase to catalyse the oxidation of malate. NAD^+ is describes as _____.

13. _____ is widely used as a cross-linking agent to cross link enzyme molecules with each other.

14. The rate determining steps of Michaelis-Menten kinetics is _____ _____.

15. Entner-Doudoroff pathway is found in _____.

16. Genomic DNA is _____resulting in the production of _____.

17. The nitrogenous base is linked to the ribose or deoxyribose sugar via a _____ _____.

18. The enzyme used in PCR technology is _____.

19. Enzyme _____ is used to joins bits of DNA.

20. _____ is the adaptor that is key to converting the triplet codons of mRNA into the protein polymers.