KATHMANDU UNIVERSITY
End Semester Examination
June/July, 2023

Marks Scored:

Level : B.E.
Year : II

Course : CEEG 201
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 06 JUL 2023

SECTION "A"
[20Q. × 0.5 = 10 marks]

Encircle the most appropriate option.

1. For a vehicle moving with a speed of 80 km per hour, the brake reaction time, in ordinary cases, is
   a. 1 sec b. 2.5 sec c. 3.0 sec d. 5 sec

2. Width of the shoulders of carriage way is generally kept?
   a. 100 cm b. 125 cm c. 200 cm d. 250 cm

3. According to Indian Road Congress, the width of single lane carriageway, is:
   a. 3.0 m b. 4.0m c. 4.5 m d. 3.75 m

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

5. In long and short wall method of estimation, the length of long wall is the center to center distance between the walls and
   a. breadth of the wall b. half breadth of wall on each side
   c. one fourth breadth of wall on each side d. twice the width of walls on each side

6. While preparing a detailed estimate
   a. weight should be measured correct to 0.001kg
   b. area should be measured correct to 0.001 sq. m
   c. volume should be measured correct to 0.0001 cum
   d. dimension should be measured correct to 0.01 m

7. The nominal design mix ratio for M20 grade concrete is
   a. 1:1:2 b. 1:1.5:3 c. 1:2:4 d. 1:3:6

8. The standard brick dimension is ……. (length × depth × height), which is prescribed by the National Building Code (NBC) of Nepal.
   a. 230 × 115 × 57 b. 190 × 90 × 90
   c. 200 × 100 × 50 d. 200 × 150 × 50

9. The surface Run-off is the quantity of water
   a. absorbed by soil b. intercepted by buildings and vegetative cover
   c. that reaches the stream channels d. required to fill surface depressions

10. Hydrograph is a graphical representation of surface run off
    a. ground water flow
    b. rain fall
    c. discharge flowing in the river
    d. evaporation rate

11. In a barrage, the crest level is kept
    a. low with large gates
    b. high with large gates
    c. high with no gates
    d. low with no gates

12. Lacey's silt factor is proportional to:
    a. $D^{1/2}$
    b. D
    c. D^2
    d. D^3, where D is the grain size in mm.

13. What is the bending moment at end supports of a simply supported beam?
    a. Maximum b. Minimum c. Zero d. Uniform

14. Determine the maximum bending moment for the below Figure 1.
    a. WL/2
    b. WL/3
    c. WL/4
    d. WL

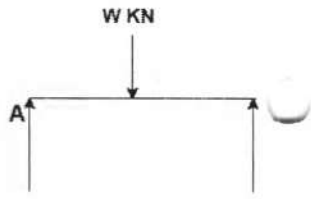


Figure 1

15. What is variation in SFD, if the type of loading in the simply supported beam is U.D.L is
    a. Rectangle
    b. Linear
    c. Trapezoidal
    d. Parabolic

16. _____ has designated the concrete mixes into a number of grades as M10, M15
    a. IS 456-2000 b. IS 456-2010 c. IS 513-1999 d. IS 465-2000

17. The difference between the time available to do a job and the time required to do the job, is known as
    a. event b. float c. duration d. constraint

18. The full form of PERT: a technique used in project scheduling is
    a. Project Evaluation and Review Technique
    b. Program Evaluation and Review Technique
    c. Project Examination and Review Technique
    d. Program Examination and Review Technique

19. Critical path
    a. always longest
    b. always shortest
    c. may be longest
    d. may be shortest

20. A _____ is used to level the ground and spreads the loose material.
    a. Excavator b. Dragline c. Grader d. Tractor

KATHMANDU UNIVERSITY
End Semester Examination
June/July, 2023

06 JUL 2023

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

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

SECTION "B"

Attempt *ALL* questions. Assume suitable data where necessary.

1. Define tendering. Write down the process involved in tendering. [1+3]

2. Determine the critical path and project duration. [3+2]

Activity	Predecessor	Duration (Week)
A	-	10
B	A	20
C	B	5
D	C	10
E	D,H	20
F	A	15
G	C,F	5
H	A	15

3. What is meant by grade of concrete? Differentiate between the nominal mix and the design mix of concrete. [1+2]

4. Draw the Shear force and Bending moment diagram and also calculate the maximum shear force and bending moment of Figure 1. [1.5+1.5+1+1]

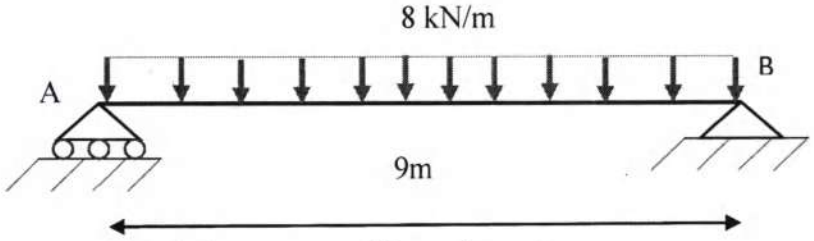


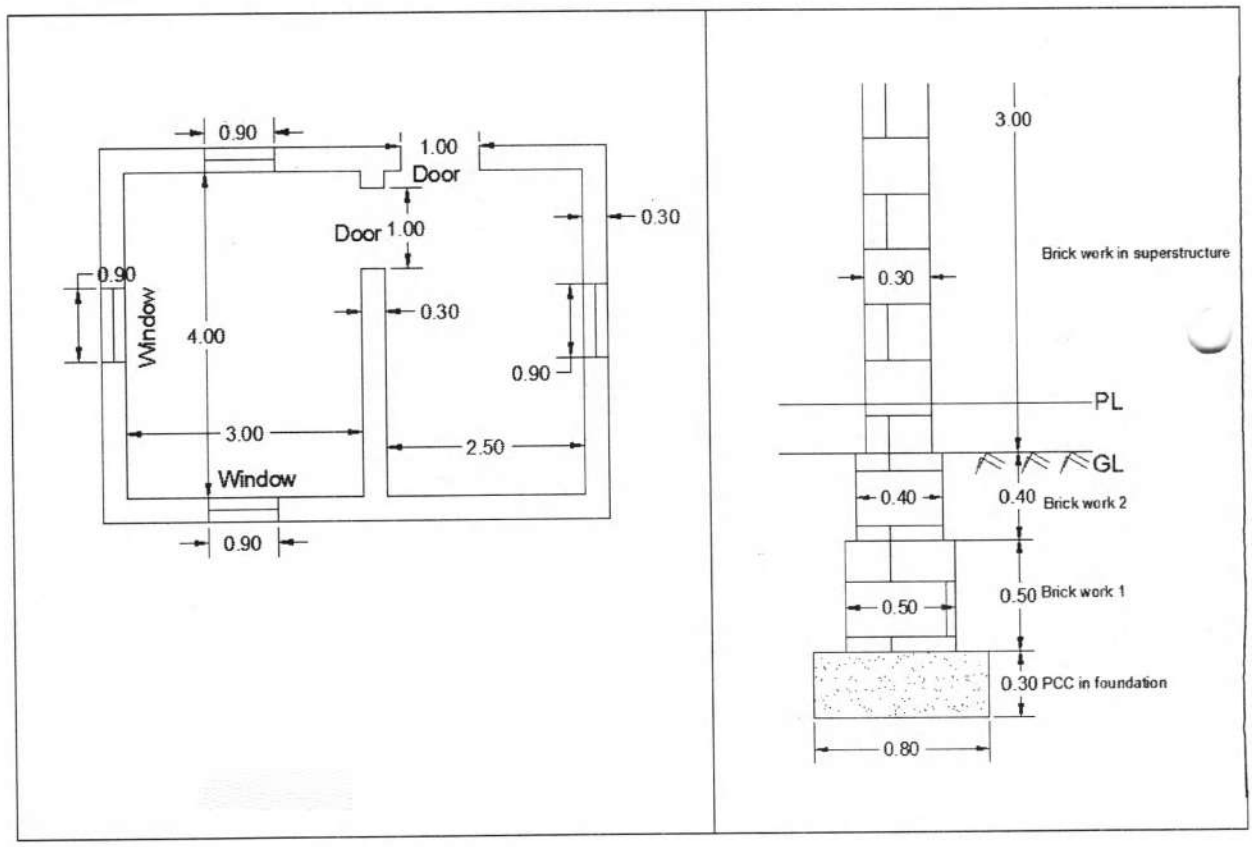
Figure 1

5. Differentiate between a weir and a barrage. [2]

6. Calculate the balancing depth for a channel section having a bed width of 8 m and side slopes of 1.5:1 in cutting & 2:1 in filling. The bank embankments are kept 0.6 m higher than ground level (Berm Level) and crest width of banks is kept 1.2 m. [5]

7. Estimate the quantity of the following items: [4 ×1.5 = 6]
   a. Earthwork in excavation
   b. Concrete work in foundation
   c. Brick works up to plinth level
   d. Brickworks in super structure

(Door height=2.1 m and window height= 1.5 m, Height from GL to PL=0.3 m)



8. Draw a typical cross section of the road section. [2]

9. Write short notes on: [4 × 1.5 = 6]
   a. Stopping Sight Distance (SSD)
   b. Extra Widening
   c. Vertical curves
   d. Origin and destination (O and D) study

10. What are the special considerations of hill road geometric design? [2]

	Molar mass	ω	T_c/K	P_c/bar	Z_c	V_c cm^3·mol^{-1}	T_n/K
Ethylene glycol	62.068	0.487	719.7	77.00	0.246	191.0	470.5
Acetic acid	60.053	0.467	592.0	57.86	0.211	179.7	391.1
n-Butyric acid	88.106	0.681	615.7	40.64	0.232	291.7	436.4
Benzoic acid	122.123	0.603	751.0	44.70	0.246	344.	522.4
Acetonitrile	41.053	0.338	545.5	48.30	0.184	173.	354.8
Methylamine	31.057	0.281	430.1	74.60	0.321	154.	266.8
Ethylamine	45.084	0.285	456.2	56.20	0.307	207.	289.7
Nitromethane	61.040	0.348	588.2	63.10	0.223	173.	374.4
Carbon tetrachloride	153.822	0.193	556.4	45.60	0.272	276.	349.8
Chloroform	119.377	0.222	536.4	54.72	0.293	239.	334.3
Dichloromethane	84.932	0.199	510.0	60.80	0.265	185.	312.9
Methyl chloride	50.488	0.153	416.3	66.80	0.276	143.	249.1
Ethyl chloride	64.514	0.190	460.4	52.70	0.275	200.	285.4
Chlorobenzene	112.558	0.250	632.4	45.20	0.265	308.	404.9
Tetrafluoroethane	102.030	0.327	374.2	40.60	0.258	198.0	247.1
Argon	39.948	0.000	150.9	48.98	0.291	74.6	87.3
Krypton	83.800	0.000	209.4	55.02	0.288	91.2	119.8
Xenon	131.30	0.000	289.7	58.40	0.286	118.0	165.0
Helium 4	4.003	−0.390	5.2	2.28	0.302	57.3	4.2
Hydrogen	2.016	−0.216	33.19	13.13	0.305	64.1	20.4
Oxygen	31.999	0.022	154.6	50.43	0.288	73.4	90.2
Nitrogen	28.014	0.038	126.2	34.00	0.289	89.2	77.3
Air†	28.851	0.035	132.2	37.45	0.289	84.8	
Chlorine	70.905	0.069	417.2	77.10	0.265	124.	239.1
Carbon monoxide	28.010	0.048	132.9	34.99	0.299	93.4	81.7
Carbon dioxide	44.010	0.224	304.2	73.83	0.274	94.0	
Carbon disulfide	76.143	0.111	552.0	79.00	0.275	160.	319.4
Hydrogen sulfide	34.082	0.094	373.5	89.63	0.284	98.5	212.8
Sulfur dioxide	64.065	0.245	430.8	78.84	0.269	122.	263.1
Sulfur trioxide	80.064	0.424	490.9	82.10	0.255	127.	317.9
Nitric oxide (NO)	30.006	0.583	180.2	64.80	0.251	58.0	121.4
Nitrous oxide (N_2O)	44.013	0.141	309.6	72.45	0.274	97.4	184.7
Hydrogen chloride	36.461	0.132	324.7	83.10	0.249	81.	188.2
Hydrogen cyanide	27.026	0.410	456.7	53.90	0.197	139.	298.9
Water	18.015	0.345	647.1	220.55	0.229	55.9	373.2
Ammonia	17.031	0.253	405.7	112.80	0.242	72.5	239.7
Nitric acid	63.013	0.714	520.0	68.90	0.231	145.	356.2
Sulfuric acid	98.080	...	924.0	64.00	0.147	177.	610.0

Table D.15: Values of ϕ^0

$P_r =$	1.0000	1.2000	1.5000	2.0000	3.0000	5.0000	7.0000	10.000
T_r								
0.30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.35	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.40	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0003
0.45	0.0016	0.0014	0.0012	0.0010	0.0008	0.0008	0.0009	0.0012
0.50	0.0055	0.0048	0.0041	0.0034	0.0028	0.0025	0.0027	0.0034
0.55	0.0146	0.0127	0.0107	0.0089	0.0072	0.0063	0.0066	0.0080
0.60	0.0321	0.0277	0.0234	0.0193	0.0154	0.0132	0.0135	0.0160
0.65	0.0611	0.0527	0.0445	0.0364	0.0289	0.0244	0.0245	0.0282
0.70	0.1045	0.0902	0.0759	0.0619	0.0488	0.0406	0.0402	0.0453
0.75	0.1641	0.1413	0.1188	0.0966	0.0757	0.0625	0.0610	0.0673
0.80	0.2404	0.2065	0.1738	0.1409	0.1102	0.0899	0.0867	0.0942
0.85	0.3319	0.2858	0.2399	0.1945	0.1517	0.1227	0.1175	0.1256
0.90	0.4375	0.3767	0.3162	0.2564	0.1995	0.1607	0.1524	0.1611
0.93	0.5058	0.4355	0.3656	0.2972	0.2307	0.1854	0.1754	0.1841
0.95	0.5521	0.4764	0.3999	0.3251	0.2523	0.2028	0.1910	0.2000
0.97	0.5984	0.5164	0.4345	0.3532	0.2748	0.2203	0.2075	0.2163
0.98	0.6223	0.5370	0.4529	0.3681	0.2864	0.2296	0.2158	0.2244
0.99	0.6442	0.5572	0.4699	0.3828	0.2978	0.2388	0.2244	0.2328
1.00	0.6668	0.5781	0.4875	0.3972	0.3097	0.2483	0.2328	0.2415
1.01	0.6792	0.5970	0.5047	0.4121	0.3214	0.2576	0.2415	0.2500
1.02	0.6902	0.6166	0.5224	0.4266	0.3334	0.2673	0.2506	0.2582
1.05	0.7194	0.6607	0.5728	0.4710	0.3690	0.2958	0.2773	0.2844
1.10	0.7586	0.7112	0.6412	0.5408	0.4285	0.3451	0.3228	0.3296
1.15	0.7907	0.7499	0.6918	0.6026	0.4875	0.3954	0.3690	0.3750
1.20	0.8166	0.7834	0.7328	0.6546	0.5420	0.4446	0.4150	0.4198
1.30	0.8590	0.8318	0.7943	0.7345	0.6383	0.5383	0.5058	0.5093
1.40	0.8892	0.8690	0.8395	0.7925	0.7145	0.6237	0.5902	0.5943
1.50	0.9141	0.8974	0.8730	0.8375	0.7745	0.6966	0.6668	0.6714
1.60	0.9311	0.9183	0.8995	0.8710	0.8222	0.7586	0.7328	0.7430
1.70	0.9462	0.9354	0.9204	0.8995	0.8610	0.8091	0.7907	0.8054

Table D.16: Values of ϕ^1

$P_r =$	1.0000	1.2000	1.5000	2.0000	3.0000	5.0000	7.0000	10.000
T_r								
0.30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.35	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.40	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.45	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001
0.50	0.0013	0.0013	0.0013	0.0012	0.0011	0.0009	0.0008	0.0006
0.55	0.0063	0.0062	0.0061	0.0058	0.0053	0.0045	0.0039	0.0031
0.60	0.0210	0.0207	0.0202	0.0194	0.0179	0.0154	0.0133	0.0108
0.65	0.0536	0.0527	0.0516	0.0497	0.0461	0.0401	0.0350	0.0289
0.70	0.1117	0.1102	0.1079	0.1040	0.0970	0.0851	0.0752	0.0629
0.75	0.1995	0.1972	0.1932	0.1871	0.1754	0.1552	0.1387	0.1178
0.80	0.3170	0.3133	0.3076	0.2978	0.2812	0.2512	0.2265	0.1954
0.85	0.4592	0.4539	0.4457	0.4325	0.4093	0.3698	0.3365	0.2951
0.90	0.6166	0.6095	0.5998	0.5834	0.5546	0.5058	0.4645	0.4130
0.93	0.7145	0.7063	0.6950	0.6761	0.6457	0.5916	0.5470	0.4898
0.95	0.7798	0.7691	0.7568	0.7379	0.7063	0.6501	0.6026	0.5432
0.97	0.8414	0.8318	0.8185	0.7998	0.7656	0.7096	0.6607	0.5984
0.98	0.8730	0.8630	0.8492	0.8298	0.7962	0.7379	0.6887	0.6266
0.99	0.9036	0.8913	0.8790	0.8590	0.8241	0.7674	0.7178	0.6546
1.00	0.9311	0.9204	0.9078	0.8872	0.8531	0.7962	0.7464	0.6823
1.01	0.9462	0.9462	0.9333	0.9162	0.8831	0.8241	0.7745	0.7096
1.02	0.9572	0.9661	0.9594	0.9419	0.9099	0.8531	0.8035	0.7379
1.05	0.9840	0.9954	1.0186	1.0162	0.9886	0.9354	0.8872	0.8222
1.10	1.0162	1.0280	1.0593	1.0990	1.1015	1.0617	1.0186	0.9572
1.15	1.0375	1.0520	1.0814	1.1376	1.1858	1.1722	1.1403	1.0864
1.20	1.0544	1.0691	1.0990	1.1588	1.2388	1.2647	1.2474	1.2050
1.30	1.0715	1.0914	1.1194	1.1776	1.2853	1.3868	1.4125	1.4061
1.40	1.0814	1.0990	1.1298	1.1858	1.2942	1.4488	1.5171	1.5524
1.50	1.0864	1.1041	1.1350	1.1858	1.2942	1.4689	1.5740	1.6520
1.60	1.0864	1.1041	1.1350	1.1858	1.2883	1.4689	1.5996	1.7140
1.70	1.0864	1.1041	1.1324	1.1803	1.2794	1.4622	1.6033	1.7458