B.Tech. (Civil Engg.) 3rd Semester (G-Scheme)
Examination, December–2025
INTRODUCTION TO CIVIL ENGINEERING
Paper– PCC-CE-201-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt any five questions. All questions carry equal marks. Question No. 1 is compulsory. Attempt one question from each Section.*

1. (a) Name three eminent works of civil engineer.
   (b) Describe dressing of stones.
   (c) Write function of cavity walls.
   (d) What are the main causes of dampness?
   (e) Write the constitute of varnish.
   (f) Write the properties and uses of two emerging construction materials. $2.5 \times 6 = 15$

Section-A

2. (a) Write a short note on Flemish bond. Draw two brick thick Flemish Bond. 6
   (b) Write a note on various defects in brick masonry. 5
   (c) Describe the construction of glass block masonry. 4
3. (a) Describe the contribution of civil engineering to the society? 6
   (b) Write a short note on green building concept. 5

(c) Explain the importance of Civil Engineering in short. 4

Section-B

4. Explain briefly- 3×5=15

(a) Tiles and its types

(b) Dressing of stones

(c) Terracotta tiles

5. (a) Differentiate between paints & varnishes. 8

(b) Write advantages of plywood and fiber boards. 7

Section-C

6. (a) Explain with sketches Collapsible doors, revolving doors and Louvered doors. 4×3=12

(b) Write briefly about fixtures and fasteners used for doors and windows. 3

7. (a) Define non load bearings partition walls. Write its types also. 8

(b) Classify types of foundations with neat sketches. What do you mean by sub soil investigation. 4+3

Section-D

8. (a) Name and explain different methods used for water proofing in roofs. 8

(b) Write a short note on steps taken to prevent dampness. 7

(a) Explain the different types of sound absorbents. 5

(d) What are the causes of excessive reverberation and formation of echoes? 6

(c) How do you insulate ceiling of a hall against external sound? 4

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B.Tech. (Civil Engineering) 3rd Semester (G-Scheme) Examination, December–2025

FLUID MECHANICS

Paper– PCC-CE-205-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt **five** questions in total. **Question No 1 is compulsory.** Attempt **one** question from each section. All questions carry equal marks.*

1. Write short note on the following: 2.5×6=15

(1) Describe in brief compressibility and viscosity.

(2) Describe the different sub groups of non-Newtonian fluid, giving example of each.

(3) Explain Pascal's Law.

(4) Differentiate between Drag and Lift.

(5) Derive the equation for actual discharge in an office meter.

(6) What do you understand by Kinematic Similarity?

Section-A

2. Distinguish between solid and fluids. Explain with examples of each. 15

3. What is Newtonian and non - Newtonian fluid? Give examples of each. 2.5×6=15

Section-B

4. With the help of a neat diagram define the terms: absolute pressure, gauge pressure and vacuum pressure. What is the relation between absolute pressure and gauge pressure? 15

5. Explain the theoretical method of determination of metacentric height. 15

Section-C

6. In a steady flow two points A and B are 0.5 m apart on a straight streamline. What is the acceleration at each point if velocity of flow varies linearly between A and B? Velocity at A is 2m/s and velocity at B is 6m/s. 15

7. What is a venturimeter? Draw a neat sketch indicating different parts of venturimeter and explain the utility of each part. 15

Section-D

8. Explain the terms: 15

   (i) Laminar boundary layer

   (ii) Turbulent boundary layer and

   (iii) Laminar sublayer.

9. Explain the terms: 15

   (i) Geometric similarity

   (ii) Kinematic similarity

   (iii) Dynamic similarity

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MATHEMATICS-III

Paper– BSC-MATH-205-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt five questions in all, by selecting one from each unit.* ***Question Number 1 is compulsory.*** *All questions carry equal marks.*

1. (a) Write Charpit's Auxiliary equation in general.

(b) Solve $z = px + 2y + \sqrt{1 + p^2 + q^2}$

(c) Define interpolation and write name of two formulas for it.

(d) Evaluate $\Gamma(\text{coshat}) = ?$

(e) Evolute $L^{-1} = \left(\frac{3}{(s-a)^2 + b^2}\right) = ?$

(f) Find the number of distinct permutations that can be formed from the letters of word RADAR.

Unit-I

2. (a) Solve $px + qy = (p + q)^{-1}$

(b) Solve $pz - q^2 = 1$

3. (a) Use method of separation of variable solve the equation $\frac{\partial^2 u}{\partial x^2} - \frac{\partial u}{\partial y} = 2u$

(b) A rod of length ℓ with insulated sides is initially at a uniform temperature u_o. Its ends are suddenly cooled to 0° C and are kept at that temperature. Find the temperature function u(x, t).

Unit-II

4. (a) Use Newton-Raphson method to find a root of the equation $x^3 - 2x - 5 = 0$

(b) Using Newton's forward difference formula find the sum $S_m = 1^3 + 2^3 + 3^3 + \text{----} + m^3$.

5. Evaluate $\int_0^1 \frac{1}{1+x}\,dx$ by both Trapezoidal and Simpson's rules with values n = 0.25, 0.125, 0.5 respectively.

Unit-III

6. (a) Evaluate $\int_0^\infty \frac{\cos 6t - \cos 4t}{t}\,dt$ by Laplace Transforms. 15

(b) If L(f(t)] = F (s), prove

$$L\{(\cos h\ bt)\ (f(t)\} = \frac{1}{2}\ [F(s - b) + f(s + b)].$$

Hence evaluate L(Cos h 3t Cos 5t).

7. (a) Apply convolution theorem to evaluate

$$L^{-1}\left\{\frac{s+2}{(s^2+4s+5)^2}\right\}$$

(b) Solve following differential equation by Laplace transforms $\frac{d^3x}{dt^3}-2\frac{d^2x}{dt^2}+5\frac{dx}{dt}=0;\ x=0,\ \frac{dx}{dt}=1$ at $t=0$ and $x=1$ at $t=\frac{\pi}{8}$.

Unit-IV

8. (a) A box contains 6 white balls and 5 red balls. In how many ways can four balls be drawn from it, if:

(i) They can be of any colours,

(ii) All balls of same colour.

(b) Prove a non-empty subset H of G is a subgroup of G iff $ab^{-1} \in H\ \forall\ a, b \in H$.

9. (a) Let H be a normal subgroup of G. Then prove that $G/H = \{xH; x \in G\}$ be a group under multiplication defined as $(xH)(yH) = xyH$, If $x, y \in G$.

(b) Let $H = <b>$ be a cyclic group of order m. Then prove $a^p \in H, p \leq m$ is a generator of H iff p and m are co-prime.