0134

B.E. DEGREE EXAMINATION, 2019

(COMMON TO ALL BRANCHES)

(THIRD SEMESTER)

00HS301. ENVIRONMENTAL STUDIES

(For the candidates of 2016-2017 batch onwards)

May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT - I

1 (a) Define deforestation. Explain the causes of deforestation. (8)

(b) Explain in detail any two non-conventional sources of energy. (7)

2. (a) Write a detailed note on :

(i) Floods. (ii) Droughts. (8)

(b) What are the different methods of extracting minerals ? Explain. (7)

UNIT - II

3. Explain the concept of an Ecosystem. Give a schematic representation of the structure of an ecosystem. (15)

4. Write short notes on the following : (15)

(a) Pyramid of numbers. (b) Pyramid of energy.

(c) Artificial ecosystem. (d) Ideal ecosystem.

UNIT - III

5. (a) Explain the direct and indirect value of Bio-diversity. (8)

(b) How do you justify India as a Mega-Diversity Nation ? Explain. (7)

6. (a) Give a brief account of Biogeographical Classification of India. (8)

(b) Explain the *Ex-situ* conservation and *In-situ* conservation of bio-diversity. (7)

UNIT - IV

7. (a) Briefly discuss the anthropogenic sources of air pollution. (8)

(b) What are the water quality standards set for drinking-water for humans ? (7)

8. (a) Discuss the man-made and natural sources of radio-active pollution. (8)

(b) Suggest measures to control radiation pollution. (7)

UNIT - V

9 Write short notes on the following : (15)

(a) Abuse of human rights. (b) National Human Right Commission.

(c) HIV / AIDS.

10. Write short notes on the following :

(a) IT's role in design of Health Care Products and Services. (8)

(b) IT's impact on design of Health Care system. (7)

Register Number :

Name of the Candidate :

0 1 5 9

B.E. DEGREE EXAMINATION, 2019

(COMMON TO ALL BRANCHES)

(THIRD SEMESTER)

CLEC-301 / OOBS-302. ENGINEERING MATHEMATICS - II / III

May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT - I

1. (a) Find the partial differential equation of all planes cutting equal intercepts from the x and y axes. (8)

   (b) Solve : $(3z - 4y)\,p + (4x - 2y)\,q = 2y - 3x$. (7)

2. (a) Solve : $p^2 + q^2 = x^2 + y^2$. (8)

   (b) Solve : $\left(D^2 + 3DD' + D'^2\right) z = x + y$ (7)

UNIT - II

3. Express $f(x) = x^2$ when $-\pi < x < \pi$, in a Fourier series of periodicity 2π. Hence, deduce that

   (a) $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \ldots\ldots\ldots = \frac{\pi^2}{6}$.

   (b) $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} + \ldots\ldots\ldots = \frac{\pi^2}{12}$.

   (c) $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots\ldots\ldots = \frac{\pi^2}{8}$. (15)

4. Find the Fourier series of periodicity 2π for

$$f(x) = \begin{cases} x & \text{in } (0, \pi) \\ 2x - x & \text{in } (\pi, 2\pi) \end{cases}$$

and hence, $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} \ldots\ldots = \frac{\pi^2}{8}$ (15)

UNIT - III

5. A string is stretched and fastened to two points l apart. Motion is started by displacing the string into the form $y = kx\,(l - x)$ from which it is released at time $t = 0$. Find the displacement of any point of the string. (15)

6. A bar 10 cm long, with insulated sides, has its ends A and B kept at 20° C and 40° C respectively, until steady state conditions prevail. The temperature at A is then suddenly raised to 50° C and at the same instant that of B is lowered to 10° C. Find the subsequent temperature function $u(x, t)$ at any time. (15)

UNIT - IV

7. (a) Find the Fourier transform of $e^{-a^2x^2}$ and hence, evaluate Fourier sine transform of $xe^{-a^2x^2}$. (5)

   (b) Show that the Fourier transform of $e^{\frac{-s^2}{2}}$ is self reciprocal. (10)

8. (a) Using transform method, prove that :

$$\int_0^{\infty} \frac{dx}{(x^2+a^2)(x^2+b^2)} = \frac{\pi}{2ab(a+b)} \quad \text{if } a, b > 0. \tag{10}$$

   (b) If F [f(x)] = F(s), then $F[f(ax)] = \frac{1}{|a|} F\left(\frac{s}{a}\right)$ where $a \neq 0$ (5)

UNIT - V

9. (a) Find : $z\left[\frac{1}{n+2}\right]$. (7)

   (b) Find : $z^{-1}\left[\frac{z}{(z-1)(z-2)}\right]$. using partial fraction method. (8)

10. (a) Find : $Z\left[a^n \sin n\theta\right]$. (5)

    (b) Solve : $y_{(n+2)} - 5y_{(n+1)} + 6y_n = n(n-1)$. given $y(0) = 0$, $y(1) = 0$. (10)

Register Number:

Name of the Candidate:

0160

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC-302/CSEC-302/PCSEC-102: MECHANICS OF SOLIDS-I

[Time : 3 Hours

April /May]

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. A normal stresses acting on two perpendicular planes at a point in a strained material are 70 MN/m^2 tensile, 35 MN/m^2 compressive. In addition, shear stress of 40 N/mm2 act on these planes. Calculate the following:
   a) The magnitude of the principle stresses
   b) The direction of the principal planes
   c) the magnitude of the maximum shear stress.

2. A solid circular bar of diameter 20 mm when subjected to an axial tensile load of 40 KN. The reduction in diameter of the rod was observed as 6.4×10^{-3} mm. The bulk modulus of the material of the bar is 67 GPa. Determine the following a) Young modulus, b) Poisson's ratio, c) Modulus of rigidity, d) change in length per meter and e) Change in volume of the bar per meter length.

UNIT – II

3. Determine moment of inertia about the centroidal axes X-X and Y-Y of an Unsymmetrical I section with following details. Top flange -100 mm × 20 mm Bottom flange -160 mm × 20 mm Web -80 mm× 20 mm

4. A hollow circular section of external diameter 100 mm has a uniform thickness of 10mm, calculate its moment of inertia with respect to
   a) Diameter
   b) Tangent to the bottom of circle
   c) The axis parallel to and 20 mm below the tangent.

UNIT – III

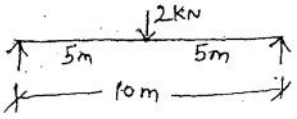
5. A beam 6 m long and simply supported at each end has a uniformly distributed load of 800 N/m extending from the left end to a point 2 m away. There is also a clockwise couple of 1500 Nm. Applied at the centre of the beam AB. Draw the shear force and bending moment diagrams for the beam and find the maximum bending moment.

6. An overhanging beam ABC is simply supported at A & B over a span of 6 m and BC overhangs by 3 m. If the supported span AB carries a central concentrated load of 8kN and overhang span BC carries 2kN/m draw the shear force and bending moment diagram.

UNIT – IV

7. A beam AB of span 6 m is simply supported at its ends is subjected to a point load of 20kN at C at a distance of 2 m from left end. Using moment area method, Compute the deflection at the point C. Slope at the points A, B and C. Take $I = 6 \times 10^8 mm^4$ *and* $E = 200GPa$.

8. A beam AB of span 10 m is simply supported at end A and B and is located as shown in figure. Take $E = 200 \times 10^6 kN/m^2$ and $I = 8.5 \times 10^8 mm^4$ find the position and magnitude deflection using Macaulay's method.



UNIT – V

9. A solid circular shaft transmits 75kW power at 200rpm. Calculate the shaft diameter, if the twist in the shaft is not to exceed one degree in 2 m length of shaft and shear stress is not exceed 50 N/mm^2. Assume the modulus of rigidity of the material of the shaft as 100 kN/mm^2

10. A leaf spring 750 mm long is required to carry a central load of 8kN. If the central deflection is not to exceed 20 mm and the bending stress is not to be greater than 200 N/mm^2. Determine the thickness, width and number of plates. Assume the width of the plates is 12 times, their thickness and modulus of elasticity of the spring's material as 200 kN/mm^2

Register Number :

Name of the Candidate :

0135

B.E. DEGREE EXAMINATION, 2019

(COMMON TO ALL BRANCHES)

(THIRD SEMESTER)

OOES-303. ENGINEERING MECHANICS

(For the Candidates of 2016-17 batch Onwards)

May] [Time : 3 Hours

Maximum : 75 Marks

Answer ONE FULL question from each unit
ALL questions carry EQUAL marks.

UNIT - I

1. (a) Find the coplanar concurrent forces acting at the point O, shown in figure-1.(8)

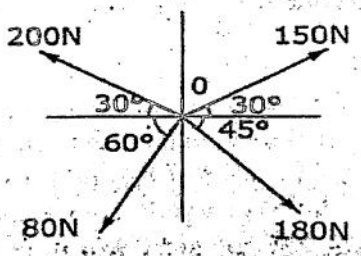


Figure -1

(b) A force vector of magnitude 40 N is directed from A (1,4) to B (6,7). Determine :

(i) Components of the force along X, Y axes.

(ii) Angles with x and y axes. (iii)Specify the force vector. (7)

(OR)

2. (a) A lamp weighing 10 N is suspended from the ceiling by a chain. It is pulled aside by a horizontal cord until the chain makes an angle of 60° with the ceiling as shown in the figure-2. Find the tensions in the chain and the cord by applying Lami's theorem. (8)

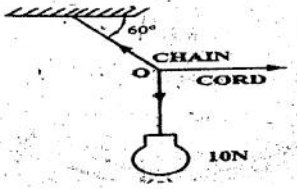


Figure - 2.

(b) The resultant of the two concurrent forces is 1500 N and the angle between the forces is 90°. The resultant makes an angle of 36° with one of the forces. Find the magnitude of each force. (7)

UNIT - II

3 (a) Four parallel forces of magnitudes 10 N, 15 N, 20 N and 35 N are shown in figure - 3. Determine the magnitude and direction of the resultant. Find the distance of the resultant from point A. (8)

Figure -3.

(b) Find the components of the beam shown in figure - 4. (7)

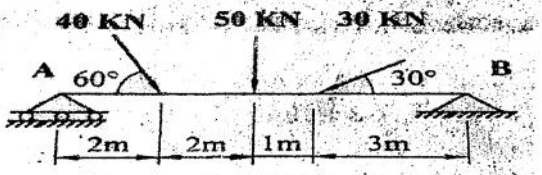


Figure - 4

(OR)

4. (a) Four forces act on a square of side 1 m as shown in figure - 5. Reduce the force system into an equivalent force couple system at A. (8)

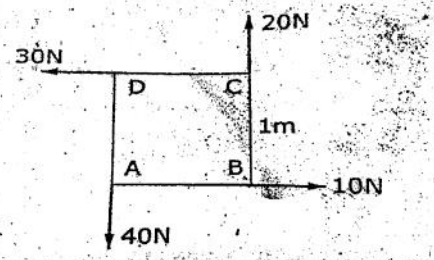


Figure - 5.

(b) State and prove Varignon's principle of moments.(Law of moments.) (7)

UNIT - III

5. Find the moment of inertia of a T-section with flange as 150 mm × 50 mm and web as 150 mm × 50 mm about X-X and Y-Y axes through the centre of gravity of the section. (Figure- 6) (15)

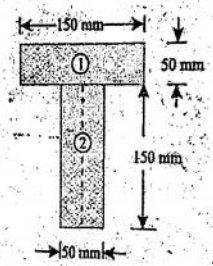


Figure - 6

(OR)

6. Find the moment of inertia of the lamina with a circular hole of 30 mm diameter about the axis AB as shown in figure - 7. (15)

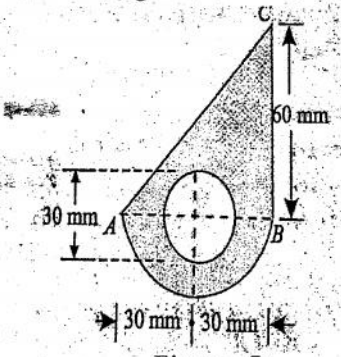


Figure -7.

UNIT - IV

7 (a) On turning a corner a motorist rushing at 20 m/s, finds a child on the road 50 m ahead. He instantly stops the engine and applies break so as to stop the car within 10 m of the child.Calculate :

(i) Retardation. and (ii) Time required to stop the car. (8)

(b) The motion of a particle is given by

$a = t^3 - 3t^2 + 5$.

Where a is the acceleration in m/s^2 and t is the time in seconds. The velocity of the particle at $t = 1$ second is 6·25 m/sec and the displacement is 8·8 metres. Calculate the displacement and velocity at $t = 2$ seconds.. (7)

(OR)

8. (a) A particle is thrown with a velocity of 5 m/s at a elevation of 60° to the horizontal. Find the velocity of another particle thrown at an elevation of 45° which will have

(a) Equal horizontal range. (b) Equal maximum height and

(c) Equal time of flight. (7)

(b) A bullet of mass 20 g is fired horizontally with a velocity of 300 m/s, from a gun carried in a carriage, which together with the gun has mass 100 kg. The resistance to sliding of the carriage over the ice on which it rests is 20 N. Find:

(i) Velocity with which the gun will recoil.

(b) Distance in which it comes to rest. (8)

UNIT - V

9. A body of mass is initially at rest on a 10° inclined plane. Then, it slides down. Calculate the distance moved by the body, on the inclined plane and the velocity reaches to 6 m/s. The co-efficient of friction between the body and the plane is 0·1. (15)

(OR)

10. (a) The mean radius of the screw of a square threaded screw jack is 25 mm. The pitch of thread is 7·5 mm. If the co-efficient of friction is 0·12, what effort applied at the end of lever 60 cm length is needed to raise a weight of 2 kN?(8)

(b) A rope is wrapped three times around a rod as shown in figure- 9. Determine the force required on the free end of the rope to support a load of 20 kN weight. The co-efficient of friction between the rope and rod is 0·30. (7)

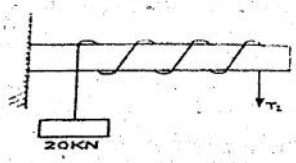


Figure -9.

Register Number:

Name of the Candidate:

0161

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC-303/CSEE-303: CONSTRUCTION ENGINEERING

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. Explain in detail about the characterization of good building stones.
2. Write neat sketches explain in the manufacturing process of bricks.

UNIT – II

3. Write in detail about classifications of stone masonry.
4. What are different types of raft foundations? Discuss the conventional method of design of raft foundations.

UNIT – III

5. Explain in detail about the different types of roofs.
6. Briefly discuss about the various types of doors and its suitability.

UNIT – IV

7. What are the ingredients of paints? Discuss.
8. Define plastering and explain the types of plastering? Discuss the procedure of plastering on new surface.

UNIT – V

9. Describe the causes of distress in concrete structures.
10. Briefly explain about the various equipment used for repairing of concrete structures.

Register Number:

Name of the Candidate:

0162

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC-304/PCLEC-104: ENGINEERING GEOLOGY

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. Discuss in detail about the various physical properties of minerals.

2. Write the physical properties of following minerals
   a) Quartz
   b) Mica
   c) Olivine

UNIT – II

3. Briefly explain the various classifications of igneous and sedimentary rocks.

4. Write the important characteristics of following rocks.
   a) Granite
   b) Lime stone
   c) Basalt
   d) Marble

UNIT – III

5. Define folds and explain their types with neat sketch.

6. Briefly discuss about the following terms with neat sketch.
   a) Overlap
   b) Dip and strike
   c) Outlier and inlier

UNIT – IV

7. a) Define seismograph and explain their working principle with neat sketch. (10)
   b) Discuss about the various prevention measures of landslides (5)

8. a) Explain in detail about the causes, effects and magnitude of earth quake. (7)
   b) Briefly explain about the different types and causes of landslides. (8)

UNIT – V

9. Briefly discus about the various components of hydrological cycle with neat sketch.

10. Discuss about the various types of earthen dam and explain about their geological consideration of its construction.

Register Number:

Name of the Candidate:

0136

B.E. DEGREE EXAMINATION, 2019

(CIVIL AND STRUCTURAL ENGINEERING)

(THIRD SEMESTER)

01ES–304: CONSTRUCTION ENGINEERING

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. Explain the method to determine the grade of sand and what is bulking of sand.
2. Explain in detail the manufacturing process of steel.

UNIT – II

3. Describe the types of deep foundation with neat sketches.
4. Discuss the determination of learning capacity form plate load test.

UNIT – III

5. Explain in detail R.C.C. works for footings, columns, slabs and beam.
6. Explain the different types of doors with neat sketches.

UNIT – IV

7. What do you mean by underpinning? Explain and write in detail about form work.
8. Explain in detail about the various types of floors and its suitability.

UNIT – V

9. Write short notes on: (i) Refractories (ii) Scalants.
10. Explain in detail about the various types of glasses.

&&&&&&&

Register Number:

Name of the Candidate:

0137

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(THIRD SEMESTER)

02PC–305: CONCRETE TECHNOLOGY

(Common with Structural Engineering)

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. a) Describe the process of hydration of cement. (7)

   b) Explain physical properties of OPC. (8)

2. Describe the various physical test conducted to justify its quality. (15)

UNIT – II

3. Enumerate the various test employed on cases aggregate and fine aggregate. (15)

4. a) What are the requirements of physical properties of good coarse aggregate for concreting? (8)

   b) Describe the water quality test conducted for concrete. (7)

UNIT – III

5. Differentiate between accelerator and retarders with suitable examples and also how you can determine dosage of admixtures. (15)

6. Explain the various test conducted on the workability of concrete. (15)

UNIT – IV

7. Explain the procedure of compressive strength test conducted on cement concrete and its significance. (15)

8. Explain the factors influencing the strength of concrete. (15)

UNIT – V

9. Design a concrete mix for M30 grade concrete as per IS Code 10262–2009. (15)

10. Describe in details about the preliminary data required for mix design and the concrete mix design procedure for M25 concrete. (15)

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Register Number:

Name of the Candidate:

0163

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC-305/CSEC-306: CONCRETE TECHNOLOGY

(COMMON WITH CIVIL AND STRUCTURAL ENGINEERING)

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. Name the various types of cement. Explain any four properties of cement and their special use.
2. Discuss the composition of Portland cement in detail.

UNIT – II

3. Explain the impact test for coarse aggregates with neat sketch. Discuss its value with IS code.
4. Discuss the water absorption and cursing strength test of coarse aggregates.

UNIT – III

5. Explain any one test for finding the workability of concrete.
6. Write short notes on i) Batching and mixing of concrete and ii) Segregation of concrete.

UNIT – IV

7. Explain briefly about the durability of concrete and the factors influencing the strength of hardened concrete.
8. Explain in detail the pulse velocity test with neat sketch.

UNIT – V

9. Give the step by step procedure for the concrete mix design using IS method.
10. Design a concrete mix of M30 using any method for the following data.

Standard deviation	= 4
Specific gravity of CA	= 2.6
Specific gravity of FA	=2.6
Specific gravity of cement	=3.15
Fineness modulus of FA	=2.8
Slump required	=25mm
Maximum size of CA	=20mm
Dry rodded density of CA	=1600kg/mm3, assume any other data required.

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(THIRD SEMESTER)

01PC–306: MECHANICS OF FLUIDS

(Common with Structural Engineering)

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. a) Define Mass Density and Specific Weight. (3)

   b) One litre of crude oil weighs 9.2 N. Calculate its specific weight, density and specific gravity. (12)

2. a) State Pascal's law. (3)

   b) An oil film of thickness 10 mm is used for lubrication between the two square parallel plate of size 0.9 m × 0.9 m in which the upper plate moves at 2 m/s required a force of 100 N to maintain this speed. Determine viscosity of the oil and kinematic viscosity of oil if the specific gravity of oil is 0.95. (12)

UNIT – II

3. a) Define the terms 'buoyancy' and 'Centre of buoyance'. (3)

   b) Determine the total pressure and position of centre of pressure on a square plate of size 1.5 m × 1.5 m is placed vertically in water in such a way the centre of plate is 3 m below the water. (12)

4. a) State the conditions of equilibrium of floating body and a submerged body. (3)

   b) A rectangular Pontoon is 4 m long 3 m wide and 1.40 m high. The depth of immersion of the Pontoon is 1.0 m in sea water. If the centre of gravity is 0.70 m above the bottom of the Pontoon, determine the meta centric height. Take the density of sea water as 1030 kg/m^3. (12)

UNIT – III

5. a) Differentiate uniform and non uniform flow. (3)

   b) Derive the continuity equation for a three dimensional flow. (12)

6. a) What is venturi meter? Write the main parts of venturi meter. (3)

   b) A venturi meter having a throat diameter of 75 mm is installed to a horizontal pipeline 150 mm diameter carrying an oil of specific gravity 0.9. The difference of pressure head is 175 mm of mercury. Determine the discharge through the Pipe. Take Cd = 0.97. (12)

UNIT – IV

7. a) Define Vena-Contracta. (3)

   b) Derive an equation for the discharge through an orifice. (12)

8. a) What is a pitot tube? (3)

   b) Derive an expression for the discharge over a rectangular weir. (12)

UNIT – V

9. a) What is hydraulic gradient line and total energy line. (3)

   b) Determine the rate of flow of water through a pipe of diameter 20 cm and length 50 m. When one end of the pipe is connected to a tank and other end of the pipe is open to the atmospheric. The pipe is horizontal and the height of water in the tank is 4 m above the centre of pipe. Take 4 f = 0.036. Consider all minor losses also. (12)

10. a) State various minor losses in a pipe flow. (3)

    b) Derive an expression for the loss of head due to sudden expansion. (12)

Register Number:

Name of the Candidate:

0164

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(THIRD SEMESTER)

CLEC-306/PCLEC–103: FLUID MECHANICS

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. Two horizontal plates are placed 1.25 cm apart. The space between them is being filled with oil of viscosity 14 poises. Calculate the shear stress in oil if upper plate is moved with a velocity of 2.5 m/s.

2. If the velocity distribution over a plate is given by $u=2/3\ y - y^2$ in which U is the velocity in m/s at a distance y meter above the plate, determine the shear stress at y=0 and y=0.15 m

UNIT – II

3. Derive the equation for metacentric height with usual notations.

4. Explain the different types of manometers with neat sketches.

UNIT – III

5. Derive the continuity equation for a three dimensional incompressible flow.

6. The water is flowing through a taper pipe of length 100 m having diameters 600 mm at the upper and 300 mm at the lower end, at the rate of 50 litres /s. the pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62 N/cm^2.

UNIT – IV

7. Derive Darcy Weisbach equation for flow through pipes.

8. The rate of flow of water through a horizontal pipe is 0.25 m^3/s. the diameter of the pipe which is 200 mm is suddenly enlarged to 400 mm. the pressure intensity in the smaller is 11.772 N/cm^2. Determine: i) loss of head due to sudden enlargement, ii) pressure intensity in the large pipe, iii) power lost due to enlargement.

UNIT – V

9. a) Explain the various types of flows. (8)

   b) Explain Chezys and Mannings formula (7)

10. Discuss the various types of jumps with neat sketch.