

Nilachal Polytechnic

Bhubaneswar

1st Internal EXam. Mock Test 2017(W)

Mechanics of Material (CET-301)

Branch : Civil Engg.

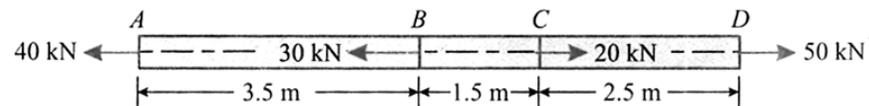
3rd Semester

Time: 1Hour

Full Mark: 60

Answer all the following questions

1. a) Define poisson's ratio. [02]
b) Draw the stress-strain diag. for mild steel specimen showing the salient points. [05]
c) Derive the relation between elastic constants E, K, G & poisson's ratio (ν)? [08]
2. a) What is Factor of safety ? [02]
b) A steel rod of 30 m long is at a temperature of 40°C . find the temperature stress produced when
(i) The expansion of the rod is prevented
(ii) Rod is permitted to expand by 6mm
c) A mild steel rod of 20 mm diameter and 300 mm long is enclosed centrally inside a hollow copper tube of external diameter 30mm and internal diameter 25mm. The ends of the rod and tube are braced together and the composite bar is subjected to an axial pull of 50kN. find out the stresses developed in the rod and the tube. Assume.
 $E_S = 200 \text{ GN/m}^2$, $E_C = 100 \text{ GN/m}^2$ [08]
3. a) State Hooke's law. [02]
b) A copper bar ABCD of 800 mm² cross sectional area and 7.5 m long is subjected to force as shown in figure. Find the total elongation of the bar. Take $E=100 \text{ GPa}$ [05]



- c) A reinforced concrete column of circular section having diameter 450mm has six steel rods of 16 mm diameter. it carries a load of 600 kN. find out stress in steel and concrete. Assume modular ratio of steel and concrete as 18. [08]
4. a) Define malleability and fatigue of a material. [02]
b) If for a material the modulus of elasticity is 140 GPa and Modulus of rigidity is 54 GPa, find the value of poisson's ratio and bulk modulus [05]
c) A RCC column of size 250 mm x 250 mm. carries a load of 270 KN. The column is reinforced with 8 bars of 16mm diameter. Find the stress in concrete and steel. If, If the stress in concrete is not exceed 5 Mpa, find the area of steel required, so that the column can carry a load of 500 KN. [08]



Nilachal Polytechnic
Bhubaneswar
1st Internal EXam. Mock Test 2017(W)
Fluid Mechanics & Hydraulic Machines
(CET-302)

Branch : Civil Engg.

3rd Semester

Answer all the following questions

1. a) Define viscosity & write down its unit ? [02]
b) Find what force is required to drag a thin plate of area 0.5m^2 between two surfaces 2.5m apart filled with liquid viscosity of $8.2 \times 10^{-2} \text{ kg-sec/m}^2$ at velocity of 0.6m/sec . The position of plate is
 - i) 1cm below the top surface
 - ii) 2cm below the top surface [05]
 - c) An inverted differential manometer is connected to two horizontal pipes A & B through which water is flowing. The vertical distance between the axes of these pipes is 30cm . When an oil of specific gravity 0.8 used as a gauge fluid, the vertical heights of water columns in the two limbs of the inverted manometer (when measured from the respective centre lines of the pipes) are found to be same and equal to 35cm . Determine the difference of pressure between the pipes. [08]
2. a) Find the specific gravity of an oil whose specific weight is 9.81kn/m^3 [02]
b) Calculate the specific weight, density and sp. Gravity of 2.5lit of a liquid which weights 15N ? [05]
c) A U-tube manometer is used to measure the pressure of water in a pipeline, which is in excess of atmospheres pressure. The right limb of the manometer contains mercury and is open to atmosphere. The contact between the water & mercury is in the left limb. Determine the pressure of water in the water in

the main line, if the difference in level of mercury in the limbs of U-tube is 10cm & the free surface of mercury is in level with the centre of the pipe ? [08]

3. a) Convert 1kg/sec-m of dynamic viscosity in poise. [02]
b) An open tank contains water for a depth of 1.5m and above it oil specific gravity 0.8 for a depth of 0.75m . Find the pressure intensity.
 - i) At the interface of two liquids
 - ii) At the bottom of the tank. [05]
 - c) The two points A and B in a pipe line has pressure of 410kN/m^2 respectively. The point B is 5m above point A. The diameter of pipe is 250mm and velocity of flow is 30m/sec . For steady flow determine loss of head between A and B. [08]
4. a) Mention the relation between absolute pressure and gauge pressure. [02]
b) The pressure intensity at a point in fluid is 4.925N/cm^2 . Find the corresponding height of the fluid in (i) water (ii) oil of specific gravity 0.9 . [05]
c) A wooden block of 2m width, 1.5m depth and 4m length floats horizontally in water. Find the volume of water displaced and position of center of buoyancy and find the metacentric height. if specific gravity of wooden block is 0.7 . [08]



Nilachal Polytechnic

Bhubaneswar

1st Internal EXam. Mock Test 2017(W)

Survey-I(CET-303)

Branch : Civil Engg.

3rd Semester

Time:

Full Mark: 60

Answer all the following questions

1. a) What do you mean by geodetic surveying? [02]
b) Describe the field procedure of chain surveying? [05]
c) What are the different kinds of ranging? Describe with sketches the method used for ranging across a high ground. [08]
2. a) What is the principle in surveying? [02]
b) Explain direct ranging and indirect ranging in chain surveying. [05]
c) What are the obstacles in chaining? Describe how will you overcome in the following cases obstacles to chaining.
 - i) Chaining free but vision obstructed.
 - ii) Chaining obstructed but vision free
 - iii) Both chaining & vision obstructed. [08]
3. a) What do you mean by RF? [02]
b) What is ranging? Describe briefly ranging across a high ground?[05]
c) A steel tape 20m long, standardized at 15°C with a pull of 10kg, was used to measure distance along a slope of 4°. If the mean temperature during measurement was 25°C and the pull applied 16kg, determine the correction required per tape length. Assume co-efficient of expansion as 112×10^{-7} per °C, cross-sectional area of tape – 0.08 cm^2 . $E = 2.1 \times 10^6 \text{ kg/cm}^2$. [08]
4. a) What is length of one link in 30m chain and gunter's chain? [02]
b) Give the conventional symbols for the following: [05]
River, swamp, pond, orchard, embankment, cultivated land, barren land
c) The length of a survey line measured with a 30m chain was found to be 315. 4m. Afterwards it was found that the chain was 5cm too long. What is the correct length of the line? [08]



Nilachal Polytechnic

Bhubaneswar

1st Internal EXam. Mock Test 2017(W)

Civil Engg. Material (CET-304)

Branch : Civil Engg.

3rd Semester

Time:

Full Mark: 60

Answer all the following questions

1. a) What is metamorphic rock? [02]
b) What are the qualities of good building stone ? [05]
c) What are the main classifications of rocks? Explain briefly? [08]
2. a) What do you mean by dressing of stone? [02]
b) Write down the difference between Flyash bricks & Conventional bricks. [05]
c) Describe the characteristics of good quality building stone. [08]
3. a) What is meant by modular bricks? [02]
b) Write down the properties of first class and second class brick. [05]
c) Explain different operation involved in the brick manufacturing process. [08]
4. a) Differentiate between terracotta and porcelain? [02]
b) Name the different clay products used in construction industries and explain briefly about one of them. [05]
c) Describe the different salient points of a good quality brick? [08]



Nilachal Polytechnic

Bhubaneswar

1st Internal EXam. Mock Test 2017(W) Construction Technology(CET-305)

Branch : Civil Engg.

3rd Semester

Time:

Full Mark: 60

Answer all the following questions

1. a) Define Building. [02]
b) Describe briefly various types of shallow foundations. [05]
c) Describe with neat sketches the various types of shallow foundations used in building construction. [08]
2. a) Define deep Foundation. [02]
b) What is a under reamed pile ? Explain it with help of a neat figure.[05]
c) Suggest a type of foundation suitable for erratic soils containing compressible lenses subjected to heavy building loads along with its basic design principles. [08]
3. a) What is hazardous building ? [02]
b) Discuss about various loads likely to be subjected in a building mentioning relevant I.S. Codes. [05]
c) A brick pier having plan area 650mm x 600mm and height of 4.25m has to carry an axial load of 600KN. The allowable bearing capacity of the soil on which the pier is to rest is 260KN/m². The weight of brick masonry is 19.02 KN/m³. The angle of repose is 32° and weight of earth is 15.92kN / m³. Design a suitable foundation for the pier. [08]
4. a) What is the purpose of site reconnaissance ? [02]
b) Describe test pit method of site exploration ? [05]
c) With help of neat figures explain the term 'Sub-structure' and 'Super-structure' of a building. [08]

