

**SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY**  
**ADITYA SILVER OAK INSTITUTE OF TECHNOLOGY**  
**BE - SEMESTER-III • MID SEMESTER-I EXAMINATION – WINTER 2017**

**SUBJECT: SURVEYING (2130601) (CL)**

DATE: 03-08-2017

TIME: 10:00am to 11:30 am

TOTAL MARKS:40

- Instructions:**
1. All the questions are compulsory.
  2. Figures to the right indicate full marks.
  3. Assume suitable data if required.

- Q.1 (a) 1. Define intersection angle. [05]  
 2. What is Mid-Ordinate?  
 3. What is the principle of plane table surveying?  
 4. List out methods of plane table surveying.  
 5. Draw a neat sketch of alidade & write its function.
- (b) Write advantages and disadvantages of plane table surveying. [05]
- Q.2 (a) List the different sources of errors in plane table surveying and [06]  
 explain each with example.
- (b) What are the different types of curves used in railways and [05]  
 highways? Describe each with sketches.
- (c) Draw labeled diagram of simple circular curve. [04]
- OR
- Q.2 (a) What is orientation? Discuss the different methods of [06]  
 orientation of a plane table.
- (b) What are different methods of designation of a curve? Derive a [05]  
 relationship between the radius and the degree of curve.
- (c) Derive an expression for setting out a simple circular curve by [04]  
 offsets from the long chord.
- Q.3 (a) Explain the procedure of setting up of plane table. [06]  
 (b) Explain the importance of setting out works. [05]  
 (c) Two straight lines intersect at chainage of 1200 and the angle of [04]  
 deflection is  $60^\circ$ . If the radius of the curve is 450m, determine  
 the following:- i) Tangent distance, ii) Length of the curve,  
 iii) Chainage of points of curvature and tangency, iv) Length of  
 the long chord, v) Degree of curve.
- OR
- Q.3 (a) Describe with neat sketch, method of intersection used for plane [06]  
 table survey. When it is used?
- (b) Discuss the method of achieving horizontal and vertical control [05]  
 in setting out works.
- (c) Compute the values of following components of simple circular [04]  
 curve and show them in the detailed sketch.  
 i) Length of curve, ii) Tangent length, iii) Length of long chord,  
 iv) Apex Distance, v) Mid-ordinate. Take radius of curve= 300m  
 & deflection angle=  $40^\circ$ .

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**BE - SEMESTER-III • MID SEMESTER-I EXAMINATION – WINTER 2017**

**SUBJECT: FLUID MECHANICS (2130602) (CL)**

**DATE: 11-08-2017**

**TIME: 10:00 am to 11:30 am**

**TOTAL MARKS: 40**

- Instructions:**
1. All the questions are compulsory.
  2. Figures to the right indicate full marks.
  3. Assume suitable data if required.

- Q.1 (a) 1. Define the terms with units or examples [05]
- i. Specific weight
  - ii. Specific gravity
  - iii. Kinematic Viscosity
  - iv. Non-Newtonian fluid
  - v. Compressibility
- (b) State and derive Pascal's Law. Note down its applications. [05]
- Q.2 (a) A square plate of size  $1\text{m} \times 1\text{m}$  and weighing  $500\text{N}$  slides down an inclined plane with a uniform velocity of  $2\text{ m/s}$ . The plane makes an angle of  $30^\circ$  to the horizontal and has oil film of  $1.5\text{ mm}$  thickness. Find the viscosity of oil. [06]
- (b) State and derive hydrostatic law. [05]
- (c) Describe different types of pressure measurement devices. [04]
- OR
- Q.2 (a) Derive an expression for depth of centre of pressure when the lamina is immersed in a liquid at an inclined angle with horizontal. [06]
- (b) An inverted differential manometer having an oil of specific gravity  $0.8$  as manometric fluid is connected by two pipes A and B which are at same level and both carrying water. Level of the oil in left limb is  $0.2\text{ m}$  above centerline of pipe A and level of the oil in right limb is  $0.45\text{ m}$  above the centre of pipe B. Calculate the difference in pressure between the two pipes. [05]
- (c) Describe different types of fluid. [04]
- Q.3 (a) A tank  $1.5\text{m} \times 1.5\text{m} \times 1.5\text{m}$  size contains water to a depth of  $0.5\text{m}$ . The upper remaining part is filled with oil of specific gravity  $0.8$ . Calculate total pressure on one side of the tank. [06]
- (b) What is surface tension? Find out the relationship between surface tension and pressure inside a liquid droplet of liquid in excess pressure outside. [05]
- (c) The pressure intensity at a point in a fluid is given by  $4\text{ N/cm}^2$ . Find the corresponding height of fluid in (i) water, (ii) oil of specific gravity  $0.85$ . [04]

OR

- Q.3 (a) Determine the total pressure and depth of centre of pressure on a triangular plate of base 3 m and altitude 3 m which is immersed in the water in such a way that plan of the plate makes an angle of  $60^\circ$  with the free surface. The base of the plate is parallel to the water surface and at a depth of 2 m from water surface. [06]
- (b) Derive the expression for capillary rise. [05]
- (c) Write short note on relationship between absolute, atmospheric and gauge pressure with a diagram. [04]

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**BE - SEMESTER-III • MID SEMESTER-I EXAMINATION – WINTER 2017**

**SUBJECT: MECHANICS OF SOLIDS (2130003) (ME/CL/AE)**

DATE: 10-08-2017

TIME: 10:00 am to 11:30 am

TOTAL MARKS: 40

- Instructions:**
1. All the questions are compulsory.
  2. Figures to the right indicate full marks.
  3. Assume suitable data if required.
  4. Refer the figure numbers as mentioned in the questions.

- Q.1 (a) Define the following terms: [05]
1. Hooke's law
  2. Modulus of Rigidity
  3. Poisson's Ratio
  4. Coplanar Non-Concurrent Forces
  5. Principle of Transmissibility
- (b) State and explain the law of parallelogram of forces. [05]
- Q.2 (a) Determine magnitude, direction & perpendicular distance from 'O' of the resultant for the force system as shown in Figure 1. [06]
- (b) Find the resultant of given force system. Also find direction of the resultant as shown in the Figure 2. [05]
- (c) Prove the notation  $E = 3 \times K (1 - 2/m)$ . [04]
- OR
- Q.2 (a) For system shown in Figure 3, if a cylinder A weight 20KN. Find weight of B and force on each chord so that the system remain in equilibrium. [06]
- (b) Determinate the magnitude and direction of resultant force of the force system as shown in Figure 4. [05]
- (c) State and explain Lami's theorem. [04]
- Q.3 (a) A stepped bar made of steel, copper and brass is under axial force as shown in Figure 5 and is in equilibrium. The diameter of steel is 12mm, diameter of copper is 16mm and diameter of brass is 20mm. Determine: i) Magnitude of unknown force P, ii) Stresses in each material and iii) Total change in length of the bar. Take  $E_{STEEL} = 200\text{GPa}$ ,  $E_{COPPER} = 100\text{GPa}$ ,  $E_{BRASS} = 80\text{GPa}$ . [06]
- (b) A steel rod of 100mm diameter is inserted into copper tube of 200mm external diameter and 100mm internal diameter. The composite section is subjected to axial tensile force of 100kN. Length of section is 0.5m.  $E_S = 2.1 \times 10^5 \text{ N/mm}^2$ ,  $E_C = 1.3 \times 10^5 \text{ N/mm}^2$ . Calculate stresses in each material. [05]
- (c) A system of four forces shown in Figure 6 has resultant 50N along X-axis. Determine magnitude & inclination of unknown force P. [04]

OR

- Q.3 (a) An assembly made up from aluminum and steel bars as shown in Figure 7, is initially stress free at temperature 32°C. The assembly is heated to bring its temperature to 82°C. Find the stresses developed in each bar. The coefficients of thermal expansions are  $1.25 \times 10^{-5}$  &  $2.25 \times 10^{-5}/^\circ\text{C}$  for steel and aluminum respectively. Take  $E_S = 200 \text{ GPa}$  &  $E_A = 75 \text{ GPa}$ . [06]
- (b) A load of 2000 kN is applied on a short concrete column 500 mm × 500 mm, reinforced with four nos. of 10 mm diameter steel bars. Find stresses in concrete and steel. Take value of E of steel as  $2.1 \times 10^5 \text{ N/mm}^2$  and for concrete  $1.4 \times 10^4 \text{ N/mm}^2$ . [05]
- (c) A circular rod of diameter 20mm and 500mm long is subjected to a tensile force of 50kN. The modulus of elasticity for steel may be taken as  $200 \text{ kN/mm}^2$ . Find stress, strain and elongation of the bar due to applied load. [04]

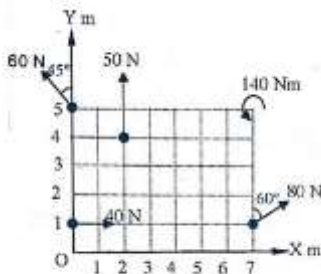


Figure 1

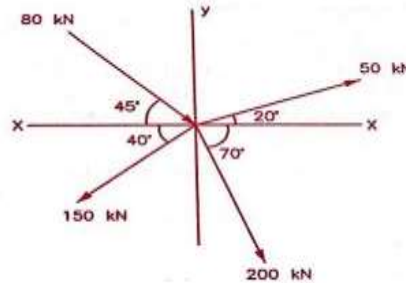


Figure 2

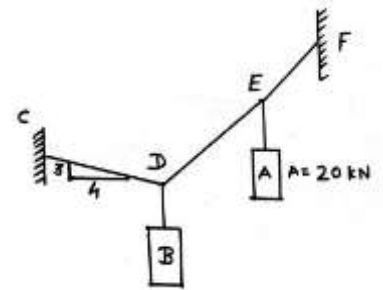


Figure 3

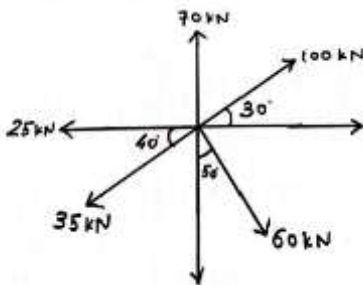


Figure 4

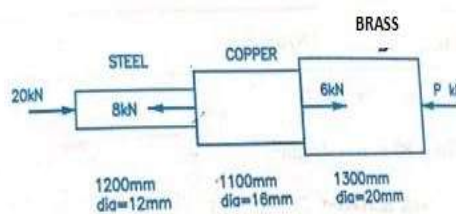


Figure 5

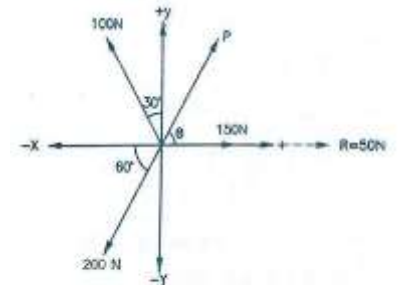


Figure 6

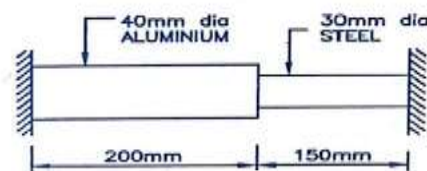


Figure 7



**SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY****BE - SEMESTER-III • MID SEMESTER-I EXAMINATION – WINTER 2017****SUBJECT: GEOTECHNICS & APPLIED GEOLOGY (2130606) (CL)**

DATE: 04-08-2017

TIME: 10:00 am to 11:30 am

TOTAL MARKS: 40

- Instructions:**
1. All the questions are compulsory.
  2. Figures to the right indicate full marks.
  3. Assume suitable data if required.

- Q.1 (a) i) The soil deposits formed from suspension in quiet fresh lake are termed as \_\_\_\_\_. [05]  
 ii) Define the term water content and degree of saturation.  
 iii) In IS soil classification what is the symbol for sandy silt?  
 iv) Define sensitivity & thixotropy.  
 v) If porosity of a soil sample is 15 %, the void ratio is \_\_\_\_.
- (b) Discuss briefly the scope of geotechnical engineering in relation to civil engineering with suitable figure. [05]
- Q.2 (a) Discuss the structure of different soils with figure. [06]  
 (b) Explain about origin of soil and its formation in detail. [05]  
 (c) Derive relationship between void ratio, specific gravity, water content & degree of saturation ( $S_r * e = w * G$ ) [04]
- OR
- Q.2 (a) A soil sample has a porosity of 40 percent. The specific gravity of solids is 2.70. Calculate: (a) void ratio, (b) dry density, (c) unit weight if the soil is 50% saturated and (d) unit weight if soil is completely saturated. [06]  
 (b) What do you mean by consistency of soil? Explain consistency limit or atterberg's limit with graph [05]  
 (c) Discuss the objective of soil classification & explain IS classification systems [04]
- Q.3 (a) Define weathering and discuss the process involved in physical, chemical & biological weathering [06]  
 (b) Explain unconfined and confined aquifers. [05]  
 (c) If the bulk unit weight of a wet soil mass is 19.8 kN/m<sup>3</sup>, find dry unit weight, void ratio and degree of saturation of soil mass. Consider water content is 12 %. [04]
- OR
- Q.3 (a) Calculate the plasticity index, liquidity index and consistency index of a soil mass for a given data. Natural water content: 50%, Liquid limit: 55%, Plastic limit 25%. [06]  
 (b) Explain hydrological cycle with figure. [05]  
 (c) Derive the functional relationship between bulk density, dry density and moisture content,  $\gamma_d = \gamma / (1+w)$  [04]
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**SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY**  
**BE - SEMESTER-III • MID SEMESTER-I EXAMINATION – WINTER 2017**

**SUBJECT: BUILDING CONSTRUCTION (2130607) (CL)**

DATE: 09-08-2017

TIME: 10:00 am to 11:30 am

TOTAL MARKS: 40

- Instructions:**
1. All the questions are compulsory.
  2. Figures to the right indicate full marks.
  3. Assume suitable data if required.

- Q.1 (a) Define terms with neat sketch: i) Reveal, ii) Header, iii) Quoin, [05]  
iv) Stretcher, v) Frog
- (b) Describe the classification of different types of buildings. [05]

- Q.2 (a) What is the sub surface investigation? What are the purposes of [06]  
site exploration? How do you decide the depth of exploration?
- (b) What are the different components of building? Show them in a [05]  
neat sketch.
- (c) Differentiate between Rubble masonry & Ashlar masonry. [04]

OR

- Q.2 (a) Enlist various methods of boring for sub soil exploration and [06]  
explain wash boring with sketch.
- (b) What are the causes of failure of foundations? [05]
- (c) What is shallow foundation and explain various types. [04]

- Q.3 (a) Describe damp proofing treatments for the following with [06]  
sketch.
- i. Foundations
  - ii. Floors
  - iii. Roof
  - iv. Parapet
- (b) Explain the methods of improving safe bearing capacity of soil? [05]
- (c) What are the causes of fire? What precautionary measures [04]  
taken to minimize the danger of fire.

OR

- Q.3 (a) What are the problems of foundation in black cotton soils? [06]  
What precautions are taken during construction of foundation  
in black cotton soil?
- (b) Describe fire resistant properties of various materials. [05]
- (c) What are the various types of stone masonry? [04]

