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T.Y. B.Tech. (Civil Engineering) (CBCS) (Semester - VI)
Examination, March - 2023
GEOTECHNICAL ENGINEERING - II
Sub. Code : 81518

Day and Date : Tuesday, 27 - 06 - 2023

Total Marks : 70

Time : 10.30 a.m. to 01.00 p.m.

- Instructions :
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary and state them clearly.
 - 4) Answer shall be supported by adequate sketches.

SECTION - I

Q1) Answer the following questions.

- a) What is soil exploration and explain its necessity/purposes? [5]
- b) Explain with neat sketch. [6]
 - i) Area ratio
 - ii) Outside clearance
 - iii) Inside clearance

Q2) Answer the following questions.

- a) Define the following terms : (any two) [5]
 - i) Ultimate bearing capacity
 - ii) Net ultimate bearing capacity
 - iii) Net safe bearing capacity
 - iv) Gross safe bearing capacity
- b) A square footing of size $2.5 \text{ m} \times 2.5 \text{ m}$ is built in a sandy soil of unit weight 17 kN/m^3 and having angle of shearing resistance of 35° . The depth of base of footing is 1.2 m below the ground surface. Calculate the safe load that can be carried by a footing with a factor of safety of 3 against shear failure. Assume that the soil fails by general shear failure. Use Terzaghi's analysis. For $\phi = 35^\circ$, the values of bearing capacity factors are $N_c = 57.8$, $N_q = 41.4$, $N_r = 42.4$. [7]

P.T.O.

Q3) Answer the following questions.

- a) What is shallow foundation? Write the difference between shallow foundation and deep foundation. [5]

OR

- a) Explain different types of settlements occurred in foundation soil.
b) Design a rectangular combined foundation for following data: [7]

Column	Size	Load	Remark
A	0.30×0.30 m	1500 kN	C/c distance between columns is 5.0 m and safe bearing capacity of soil is 150 kN/m^2
B	0.30×0.30 m	1200 kN	

Column B is exterior and column A is interior column.

SECTION - II

Q4) Answer the following questions.

- a) Explain the various classification of piles. [5]

OR

- a) Write the limitations of 'Dynamic Formulae'.
b) In a 25 pile group, the pile diameter is 500 mm and center to center spacing of the square group is 1.6 m. All piles are 12 m long. Neglect bearing at the tip of the pile and shear mobilization around each pile. Determine whether the failure would occur with the pile acting individually or as a group. Assume $c = 48 \text{ kN/m}^2$. [7]

Q5) Answer the following questions.

- a) Write short note on Caisson disease. [5]

OR

- a) Write note on Stone column.
b) Draw cross section of well foundation and discuss the components of well foundation. [6]

Q6) Answer the following questions.

- a) What are different types of slope failure. [5]
b) A cutting is to be made in clay for which the cohesion is 35 kN/m^2 and $\phi = 0^\circ$. The density of the soil is 20 kN/m^3 . Find the maximum depth for a cutting of side slope 1.5:1 if the factor of safety is to be 1.5. Take the stability number for a 1.5:1 slope and $\phi = 0^\circ$ as 0.17. [7]



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T.Y. B.Tech. (Civil Engineering) (CBCS) (Semester - V)

Examination, March - 2023

ENVIRONMENTAL ENGINEERING - I

Sub. Code : 80765

Day and Date : Monday, 26 - 06 - 2023

Total Marks : 70

Time : 02.30 p.m. to 05.00 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary and state them clearly.
 - 4) Answer shall be supported by adequate sketches.

SECTION - I

Q1) Attempt all questions.

- a) What are various types of demand of water for town with fig? Also mention the factors affecting water demand. [6]
- b) Write a brief note on : [6]
 - i) Infiltration Galleries
 - ii) MPN
 - iii) Common water borne diseases

Q2) Attempt any two:

- a) State the objectives of using coagulant aid. Enumerate the coagulant aids used in water treatment. [6]

OR

- a) Design a cascade aerator for treating flow of 10 MLD. [6]
- b) Explain the principle and working of Tube settler. [6]

Q3) Attempt any two:

- a) What is break point chlorination? Explain with graph. [6]
- b) Write a short note on : [5]
 - i) The theory of filtration
 - ii) Reverse Osmosis

OR

- b) Give the stoichiometric equations of the Lime-Soda softening process. [5]

P.T.O.

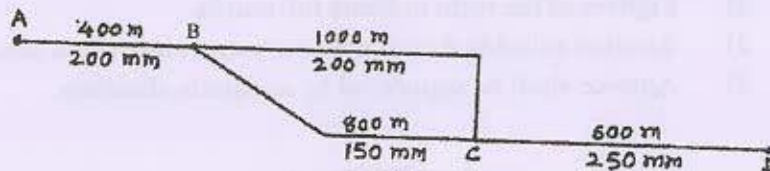
SECTION - II

Q4) Attempt all questions.

- a) Give the advantages and disadvantages of cast-iron and R.C.C. pipes used for water supply scheme. [6]
- b) Write a short note on Thrust block design. [6]

Q5) Attempt any two:

- a) Determine the diameter of an equivalent pipeline 2000 m in length to replace the pipe system given below. (Length in m, Diameter in mm). [8]



OR

- a) Draw neat sketch of pumping and combined water distribution system and explain working of each. [8]
- b) What are basic functional and hydraulic requirements of a water distribution system. [4]

Q6) Attempt any two:

- a) Sketch and explain : [6]
 - i) Air relief valve
 - ii) Non-return valve

OR

- a) Enumerate the methods of leakage detection in water distribution system. Explain any one method. [6]
- b) Explain concept of preparation of DPR. [5]

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**T.Y. B.Tech. (Civil Engineering) (CBCS) (Semester - III)**  
**Examination, March - 2023**  
**DESIGN OF STEEL STRUCTURE**  
**Sub. Code : 80764**

Day and Date : Saturday, 24 - 06 - 2023

Total Marks : 70

Time : 02.30 p.m. to 05.00 p.m.

- Instructions :
- 1) Q. No. 1 and Q. No. 5 are compulsory.
  - 2) Attempt any two questions from Q. No. 2, 3, 4 and any two questions from Q. No. 6, 7, 8.
  - 3) Assume suitable data if necessary and state them clearly.
  - 4) Answer shall be supported by adequate sketches.

**SECTION - I**

- Q1)** Attempt any two questions. [7]
- a) Differentiate between working stress methods and limit state method.
  - b) Explain the term slenderness ratio. Why least of gyration is considered for the design of compression member?
  - c) What is shear lag?
- Q2)** A tie member of a roof truss consists of 2-ISA 125 × 75 × 10 mm. The tie member is subjected to pull of 250 KN. The angles are connected on same side of a gusset plate of 10 mm thick with short legs back to back. Design the weld. [14]
- Q3)** Design a tension member to carry factored load of 500 kN by LSM consisting of pair of unequal angles back to back connected to opposite side of gusset plate by weld. Design connections and draw neat sketch. [14]
- Q4)** Design a single angle strut for a roof truss carrying a compressive load of 100 kN. The length of strut between c/c intersections is 210 cm. Also design A Welded end Connection. [14]

**P.T.O.**

SECTION - II

Q5) Attempt any two questions.

[7]

- a) Write a note on web buckling and web crippling.
- b) Write a note on curtailment of flange.
- c) Draw neat sketch of the typical cross sections for gantry girder.

Q6) Design a column to carry axial compression of 1400 kN and having a length of 6m. It is effectively held in position at both ends, but restrained against rotation. Design built-up section by using two channel sections. Also design suitable lacing system.

[14]

Q7) A simply supported beam 5m span carries uniformly distributed load of 40 kN/m. In addition, the beam carries a central point load of 50 kN. The beam is laterally supported. Design the section and check the section for shear and deflection.

[14]

Q8) Calculate the design forces for the gantry girder with following data: [14]

- a) Span of crane bridge 18m
- b) Span of gantry girder - 10m
- c) Wheel base - 3.7m
- d) Wt. of crane bridge - 145 kN
- e) Wt. of trolley and hook - 55 kN
- f) Load lifting capacity of gantry girder = 150 kN
- g) Minimum approach of hook - 1.2m
- h) Wt. of rail section = 0.3 kN/m
- i) Height of rail section - 75mm

Gantry girder is electrically operated. Loads given in the data above





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**T.Y. B.Tech. (Civil Engineering) (CBCS) (Semester-VI)**

**Examination, March - 2023**

**ENVIRONMENTAL ENGINEERING - II**

**Sub. Code : 81517**

**Day and Date : Saturday, 01 - 07 - 2023**

**Total Marks : 70**

**Time : 10.30 a.m. to 01.00 p.m.**

- Instructions :**
- 1) All questions are compulsory.
  - 2) Figures to the right indicate full marks.
  - 3) Assume suitable data if necessary and state them clearly.
  - 4) Answer shall be supported by adequate sketches.

**SECTION - I**

**Q1) Solve the following.**

- a) Explain with neat sketches the layout patterns of sewerage system. [5]
- b) Determine the velocity and discharge for a 150 mm dia circular sewer, laid with a slope of 1 in 150, when flowing at half depth. Manning's coefficient = 0.012. [6]

**Q2) Answer any two of the following.**

- a) Give the significance of COD and BOD in Wastewater treatment. [6]
- b) Discuss modifications in the activated sludge process. [6]
- c) Give the design parameters of bar rack. [6]

**Q3) Answer any two of the following.**

- a) Explain concept of anaerobic sludge digestion. Which factors control the working of this process? [6]
- b) Give the types, advantages and limitations of waste stabilization pond. [6]
- c) Give design criteria and operation of septic tank. [6]

**P.T.O.**

SECTION - II

**Q4)** Solve the following.

- a) Give effluents standards for stream and land disposal as per MPCB and CPCB standards. [5]
- b) Explain DO sag curve in detail. [6]

**Q5)** Answer any two of the following.

- a) Explain the sources and characteristics of Municipal solid waste. [6]
- b) State various methods of solid waste collection from the City. Explain one of it in detail. [6]
- c) Explain the factors affecting composting. [6]

**Q6)** Write short notes on any two:

- a) Bag Filter [6]
- b) Cyclone separator [6]
- c) Settling chamber [6]

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T.Y. B.Tech. (Civil Engineering) (CBCS) (Semester-V)

Examination, March - 2023

ENERGY AND ENVIRONMENT

Sub. Code : 80768

Day and Date : Friday, 30 - 06 - 2023

Total Marks : 70

Time : 02.30 p.m. to 05.00 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary and state them clearly.
 - 4) Answer shall be supported by adequate sketches.

SECTION - I

Q1) Attempt all questions.

- a) Explain Primary and Secondary Energy. [6]
- b) State different factors affecting on production of Biogas. [6]

Q2) Attempt all questions.

- a) Enlist different types of Coal with their use. [6]
- b) Classify Wind mills with neat diagram. [5]

Q3) Attempt any two: [12]

- a) Write a short note on "Green Building". [6]
- b) Explain in detail three laws of Energy. [6]
- c) Make a comment on Non-conventional Energy. [6]

P.T.O

SECTION - II

Q4) Attempt all questions.

- a) Write a short note on "EIA". [6]
- b) Explain in Energy Audit System. [6]

Q5) Attempt all questions.

- a) What are the causes of Green house effect? [6]
- b) Discuss limitation of "EIA". [5]

Q6) Attempt any two:

- a) What are the causes of Global warming? [6]
- b) What are the different stages in Energy Audit? [6]
- c) What are the effects Acid Rain? [6]



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T. Y. B.Tech. (Civil Engineering) (CBCS)
(Semester - VI) Examination, March - 2023
SOIL AND WATER CONSERVATION TECHNIQUES
Sub. Code : 81519

Day and Date : Wednesday, 05 - 07 - 2023

Total Marks : 70

Time : 10.30 a.m. to 01.00 p.m.

- Instructions :
- 1) All Questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary and state them clearly.
 - 4) Answer shall be supported by adequate sketches.

SECTION - I

Q1) Attempt all questions.

- a) Elaborate principles of soil erosion. [5]
- b) Explain mechanism of soil erosion with diagram. [6]

Q2) Attempt any Two.

- a) Illustrate bench terracing. [6]
- b) Short note - construction of contour bunds. [6]
- c) State principles of gully control. [6]

Q3) Attempt any Two.

- a) Elaborate susceptible area to stream bank erosion. [6]
- b) What are the objectives of river training works? [6]
- c) Explain causes of stream bank erosion. [6]

P.T.O.

SECTION - II

Q4) Attempt all questions.

- a) Explain the importance of water harvesting. [5]
- b) Explain water harvesting techniques in urban areas. [6]

Q5) Attempt any Two.

- a) Elaborate watershed models. [6]
- b) Differentiate between deterministic models and stochastic models. [6]
- c) Classify watershed models based on nature of the algorithms. [6]

Q6) Attempt any Two.

- a) Enlist sources of ground water and explain any one in detail. [6]
- b) Explain zones of ground water. [6]
- c) Enlist ground water conservation techniques explain any one in detail. [6]



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T. Y. B.Tech. (Civil Engineering) (CBCS)
(Semester - VI) Examination, March - 2023
DISASTER RISK MANAGEMENT (Open Elective - II)
Sub. Code : 81520

Day and Date : Wednesday, 05 - 07 - 2023

Total Marks : 70

Time : 10.30 a.m. to 01.00 p.m.

- Instructions :
- 1) All Questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data wherever necessary and state them clearly.
 - 4) Answer shall be supported by adequate sketches.

SECTION - I

Q1) Attempt all questions.

[12]

- a) Explain the terms:
- i) Hazard
 - ii) Risk
 - iii) Resilience
- b) Compare and Contrast between adaption and mitigation.

Q2) Attempt any Two.

[12]

- a) Classify types of disasters. Explain any one in each type.
- b) Illustrate the role of human in natural and manmade disasters.
- c) Describe the causes and effects of 'flooding in urban areas' as a manmade disaster.

Q3) Attempt any Two.

[11]

- a) Identify environmental impacts of disaster and briefly explain.
- b) Identify economic impact of disasters and briefly explain.
- c) Analyze recent global trends in disaster.

P.T.O.

SECTION - II**Q4) Attempt all questions.****[12]**

- a) List the components of disaster risk reduction. Suitably elaborate on each one.
- b) Explain the role of early warning system in disaster risk reduction.

Q5) Attempt any Two.**[12]**

- a) List and explain the factors affecting vulnerability.
- b) Explain types of vulnerability.
- c) Justify the statement, 'Climate change makes human more vulnerable to disasters'.

Q6) Attempt any Two.**[11]**

- a) Evaluate current disaster profile of India.
- b) Compile salient features of Disaster Management Act 2005.
- c) Elaborate on usefulness of Remote Sensing and GIS in disaster management.

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T.Y. B.Tech. (Civil Engineering) (CBCS) (Semester - VI)

Examination, March - 2023

THEORY OF STRUCTURES

Sub. Code : 81515

Day and Date : Friday, 23 - 06 - 2023

Total Marks : 70

Time : 10.30 a.m. to 01.00 p.m.

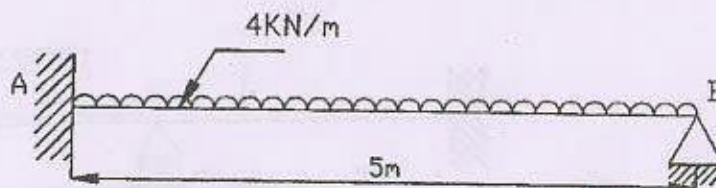
- Instructions :**
- 1) Q.No. 1 & 5 are compulsory questions.
 - 2) Solve any two questions from Q.No. 2 to Q.No. 4 and any two question from Q.No. 6 to Q.No. 8.
 - 3) Figures to the right indicate full marks.
 - 4) Assume suitable data if necessary and state them clearly.
 - 5) Use of non-programmable calculator is allowed.

SECTION - I

Q1) Write a short note on following.

- a) What is internal static indeterminacy of the structure? [2]
- b) Explain in detail Clapeyron's theorem of three moments. [3]
- c) What is Castiglione's theorem explain in detail. [2]

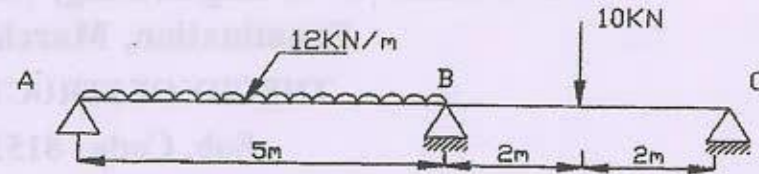
Q2) Analyse the propped cantilever beam loaded as shown in the figure below by using consistent deformation method. Also draw SFD and BMD. [14]



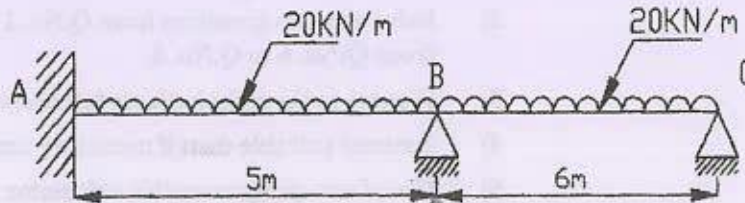
P.T.O.

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- Q3) A continuous beam ABC is loaded as shown in the figure below. Find out supports moments and reactions by using Clapeyron's theorem of three moments. Also draw BMD. [14]

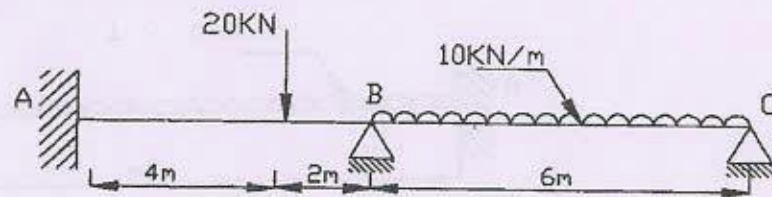


- Q4) Analyse the continuous beam ABC by using Castiglione's theorem as shown in the figure below. [14]



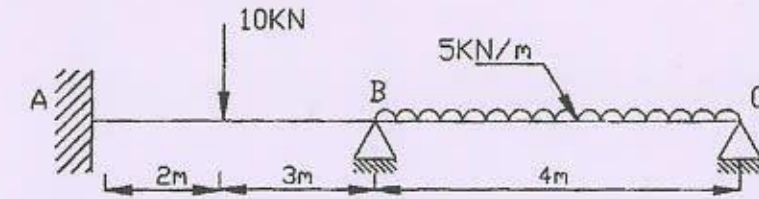
SECTION - II

- Q5) Write short note on following. [2]
 a) Explain slope deflection equation method in detail. [2]
 b) What is distribution factor used in moment distribution method? [2]
 c) Write down properties of stiffness matrix. [3]
- Q6) Analyse continuous beam ABC as shown in figure below by using slope and deflection equation and draw BMD. [14]

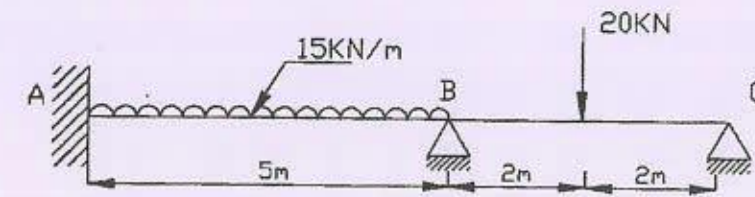


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- Q7) Analyse continuous beam ABC as shown in figure below by using moment distribution method and draw BMD. [14]



- Q8) Analyse beam ABC as shown in figure below by using stiffness matrix method and also draw BMD. [14]



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T.Y. B.Tech. (Civil Engineering) (CBCS) (Semester - V)

Examination, March - 2023

GEOTECHNICAL ENGINEERING - I

Sub. Code : 80766

Day and Date : Tuesday, 27 - 06 - 2023

Total Marks : 70

Time : 02.30 p.m. to 05.00 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary and state them clearly.
 - 4) Answer shall be supported by adequate sketches.

SECTION - I

Q1) Attempt all questions. [12]

- a) Derive relation between degree of saturation, voids ratio, bulk unit weight and specific gravity. [6]
- b) In a liquid limit test, specimens of certain sample of clay, the following readings were obtained: [6]

Water content	31.93	27.62	25.51	23.30
No. of blows	5	16	23	42

The plastic limit of clay is 13% natural water content 18%. Determine liquid limit, plasticity index, liquidity index, relative consistency and flow index.

Q2) Attempt any two: [11]

- a) Explain factors affecting permeability. [5]
- b) Determine average coefficient of permeability in horizontal and vertical directions for a deposit consisting of three layers of thickness 5m, 1m and 2.5m and having the coefficients of permeability of 3×10^{-2} , 3×10^{-5} and 4×10^{-2} mm/sec. Assume the layers to be isotropic. [5]
- c) Calculate effective stress, pore pressure and total stress at 6m below ground level where water table is at 3m below ground level. For following properties of soil, dry unit weight of soil 16.5 kN/cum, moisture content of soil above water table 15% and specific gravity of soil 2.7. [6]

P.T.O.

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Q6) Attempt any two:

[12]

- a) What are the assumptions of Rankine's theory? [6]
- b) A retaining wall 5m high retains dry sand with an angle of internal friction of 30 degrees and unit weight of 17 kN/cum. Determine passive earth pressure and its location. [6]
- c) A retaining wall 12m high retains dry sand with an angle of internal friction of 30 degrees and unit weight of 16.5 kN/cum. The uniform surcharge of 30 kN/sqm acts on top of sand layer. Determine active earth pressure and its location. [6]



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Q3) Attempt any two:

[12]

- a) Differentiate between standard proctor test and modified proctor test. [6]
- b) Explain log-time curve fitting method to find coefficient of consolidation (C_v). [6]
- c) In a consolidation test the following results have been obtained. When the load was changed from 50 kN/sqm to 100 kN/sqm, the void ratio changed from 0.70 to 0.65. Determine the coefficient of volume decrease, m_v and the compression index C_c . [6]

SECTION - II

Q4) Attempt all questions.

[12]

- a) States assumptions made in Boussinesq theory. [6]
- b) A line load of 200 kN/m run extends to a long distance. Determine the intensity of vertical stress at a point, 2m below the surface for the following two cases: [6]
- i) Directly under the line load
- ii) At a distance of 4m perpendicular to the line load
- Use Boussinesq's theory

Q5) Attempt any two:

[11]

- a) Explain triaxial shear test with merits and demerits. [5]
- b) A cylindrical specimen of sand was tested in Triaxial test apparatus. Failure occurred under cell pressure of 120 kN/sqm at a deviator stress of 400 kN/sqm. Determine angle of internal friction, angle of failure plane w.r.t. horizontal, normal and shear stresses on failure plane. [5]
- c) In a triaxial shear test following data was obtained. Find shear strength parameters. [6]

Cell pressure (kN/sqm)	200	400	600
Deviator stress (kN/sqm)	118	240	352

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T. Y. B.Tech. (Civil Engineering) (CBCS)
(Semester - VI) Examination, March - 2023
ENGINEERING MANAGEMENT
Sub. Code : 81516

Day and Date : Sunday, 02 - 07 - 2023

Total Marks : 70

Time : 10.30 a.m. to 01.00 p.m.

- Instructions :
- 1) All Questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary and state them clearly.
 - 4) Answer shall be supported by adequate sketches.

SECTION - I

Q1) Solve the followings.

- a) Define organization and explain the types of organization in detail. [6]
- b) Describe in brief the process of decision making with diagram. [5]

Q2) Solve the followings.

- a) Draw network, find duration. Draw critical path : [7]
 - i) A is first work to be done
 - ii) B and C can be done concurrently and must follow A
 - iii) B must precede D
 - iv) E must succeed C but it can't start until B is completed
 - v) The last job F depends on D and E
 - vi) A-2, B-2, C-3, D-2, E-4, F-5.
- b) What do you understand by network updating? Why is it necessary? [5]

OR

- b) Write a short note on - [5]
 - i) Work breakdown structure
 - ii) Resource allocation

P.T.O.

Q3) Solve the followings.

- a) For the information given in the table determine the critical path and standard deviation for the network. Determine the probability of completing the project in 35 days. [7]

(For $Z = 1.0$, $Pr = 84.13\%$ and $Z = 1.1$, $Pr = 86.42\%$)

Activity	Optimistic time	Most likely time	Pessimistic time
1-2	6	9	18
1-3	5	8	17
2-4	4	7	22
2-5	4	7	10
3-4	4	7	16
3-5	2	5	8
4-5	4	10	21

- b) Explain concept of precedence network. [5]

SECTION - II

Q4) Solve the following.

- a) Explain inventory control and objectives of inventory control. [6]
 b) A construction company consumes 12,000 cement bags every year for its construction activities. It requires Rs. 250 to place order. Each bag costs Rs. 200. If inventory carrying cost is 11% of average inventory investment, find out EOQ. How many times the order can be placed in one year? [6]

Q5) Solve the followings.

- a) Write down the procedure for value analysis. [6]
 b) The details of two construction machines are given below. Suggest which construction machine should be purchased. If rate of interest is 12%. Use Present Worth method. [6]

	Machine 'X'	Machine 'Y'
Initial cost (Rs.)	1,00,000	1,60,000
Annual O & M cost (Rs.)	60,000	50,000
Salvage value (Rs.)	10,000	20,000
Service life (Yrs.)	10	10

[11]

Q6) Attempt any Two.

- a) What are the factors considered for site layout?
 b) Draw a site layout for construction of an apartment.
 c) Explain the safety measures to be taken on construction site.

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