Register Number :

Name of the Candidate :

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B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-601 / PCLEC-304. HYDROLOGY

(Common with Part-Time)

May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.

UNIT – I

1. (a) Discuss the global water budget. (8)

   (b) Write short note on *transitory systems*. (7)

(OR)

2. (a) Explain the constituents of the atmosphere. (8)

   (b) Draw the diagram of general circulation of the northern hemisphere. (7)

UNIT - II

3. (a) The analysis of a storm yielded the following information regarding isohyets. Calculate the average depth of rainfall. (8)

Isoyet (mm) interval	70-80	80-90	90-100	100-110	110-120	120-130
Area (km^2)	10	86	112	98	130	65

   (b) Explain the tipping bucket type rain gauge with neat sketch. (7)

(OR)

4. (a) How is the double mass curve technique used to check the consistency of rainfall? (8)

   (b) Discuss the ISI norms for the rain-gauge density. (7)

UNIT - III

5. (a) What are the factors affecting evaporation? Explain. (8)

   (b) Distinguish between ϕ -index and w-index. (7)

(OR)

6. (a) A 6 hour storm produced rainfall intensities of 8, 17, 25, 12, 10 and 4 mm/hr in successive one hour intervals over a basin of 850 sq.km. The resulting run-off is observed to be 2700 hectare-metres. Determine the average infiltration loss. (8)

(b) Write a note on lysimeter method of estimation of evapotranspiration. (7)

UNIT - IV

7. (a) Describe the rain-fall run-off relationships. (7)

(b) How will you select the site of a stream-gauging? (8)

(OR)

8. (a) Describe the stage discharge relationship in detail. (8)

(b) State the assumptions and applications of unit hydrograph. (7)

UNIT - V

9. Discuss the principle of flood routing through a reservoir generally used. (15)

(OR)

10. Describe the design flood. Explain the methods of flood fore-casting. (15)

Register Number :

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B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-602 / PCLEC-202 . HYDRAULICS AND HYDRAULIC MACHINERY

(Common with Part-Time)

May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.
EACH question carries FIFTEEN marks.

UNIT – I

1. Find the slope of the bed of a rectangular channel of width 5 m and depth 2 m with flow rate of 20 m^3/s. Take Chezy's constant C = 50. (15)

(OR)

2. (a) State Buckingam π -theroem. (3)

   (b) The efficiency n of a fan depends on density (ρ) , vicosity (μ) of a liquid, angular velocity (ω). Obtain efficiency *(n)* in terms of dimensionless parameter. (12)

UNIT - II

3. A jet of water diameter 10 cm strikes a flat plate normally with a velocity of 15 m/sec. The plate is moving with a velocity of 6 m/sec in the direction of jet and away. Find the force exerted by the jet on plate, work done by the jet on plate per second. (15)

(OR)

4. A jet of water having a velocity of 15 m/sec strikes a curved vane moving with a velocity of 5 m/sec. The vane is symmetrical and is so shaped that the jet is deflected through 120°. Find the angle of jet at inlet of the vane so that there is no shock. What is the absolute velcoity of jet at outlet in magnitude, direction and work done per unit weight of water? Assume the vane to be smooth. (15)

UNIT - III

5. (a) How will you classify turbines? (7)

(b) A Pelton wheel of mean bucket speed of 10 m/sec with jet of water flowing at a rate of 700 ltires/sec under a head of 30 m. The bucket deflect through an angle of 160°. Calculate the power given by water and hydraulic efficiency of turbine. Assume co-efficient of velocity = 0·98. (8)

6. Explain the various components of radial flow reaction turbines with neat sketch. (15)

UNIT - IV

7. (a) Draw and discuss the operating characteristics curve of centrifugal pump. (8)

   (b) What is cavitation? Explain its causes with prevention. (7)

(OR)

8. The outer diameter of an impeller of a centrifugal pump is 400 mm and width 50 mm. The pump is running at 800 *rpm* and is working against a head of 15 m. The vane angle at outlet is 40°, efficiency 75%. Determine the velocity of flow at outlet, velocity of water leaving the vane, angle made by velocity at outlet with direction of motion at outlet and discharge. (15)

UNIT - V

9. Explain the main parts fo reciprocating pump with neat sketches. (15)

(OR)

10. A single acting reciprocating pump running at 500 rpm delivers 0·01 m^3/s of water. The diameter of piston is 200 mm, stroke length 400 mm. Determine the theoretical discharge of pump, co-efficient fo discharge, slip and percentage of slip of pump. (15)

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B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-603 / CSEC-602 / PCLEC-303 / PCSEC-504. STRUCTURAL MECHANICS - II

(Common with Civil and Structural and Part-Time)

May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.

Assume any reasonable missing data.

ALL questions carry EQUAL marks.

UNIT – I

1. Analyse the continuous beam shown in figure-1 by slope deflection method. EI = Constant.

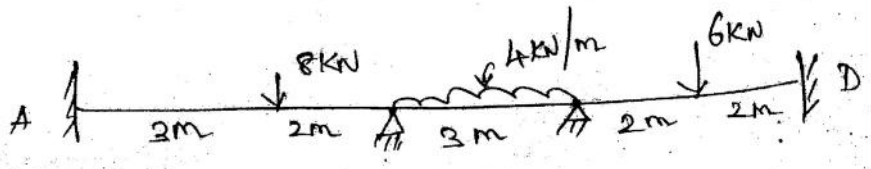

Figure-1

(OR)

2. Analyse the frame shown in figure-2 by slope deflection method.

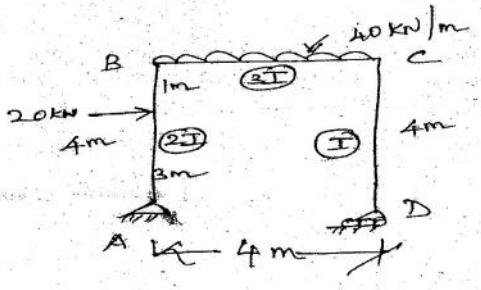

Figure-2

UNIT - II

3. Analyse the continuous beam shown in figure-3 by strain energy method.

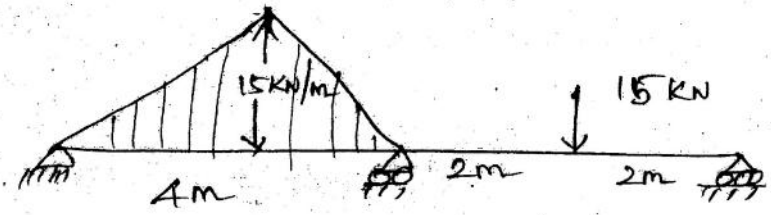

Figure-3.

(OR)

4. Analyse the portal frame shown in figure-4 by strain energy method.

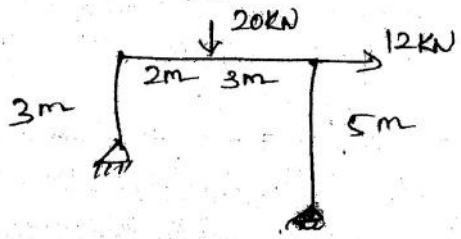

Figure-4.

UNIT - III

5. Analyse the continuous beam shown in figure-5 by flexibility method.

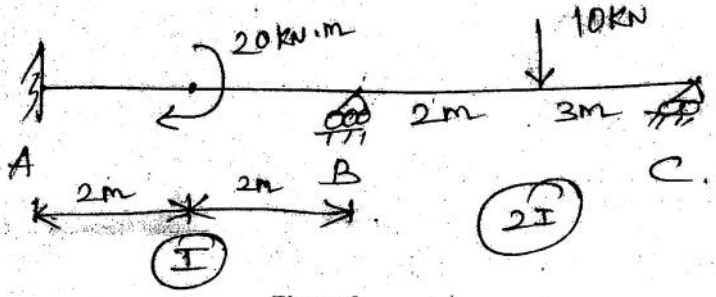

Figure-5.

(OR)

6. Analyse the portal frame shown in figure-6 by flexibility method.

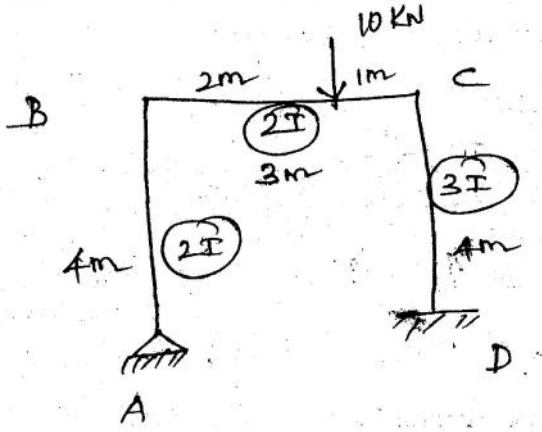

Figure-6

UNIT - IV

7. Analyse the continous beam shown in figure -7 by stiffness matrix method.

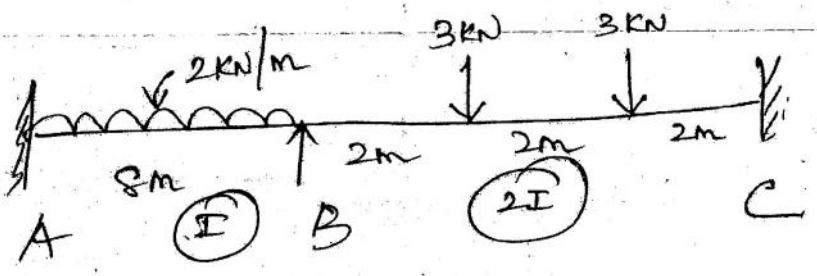

Figure-7

(OR)

8. Analyse the portal frame shown in figure-8 by stiffness matrix method.

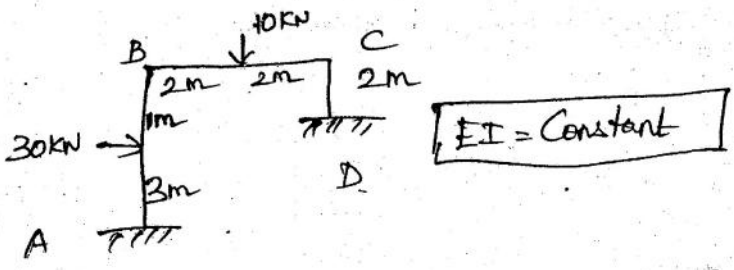

Figure-8

UNIT - V

9. Analyse the continuous beam shown in figure-9 by stiffness matrix method. EI is constant.

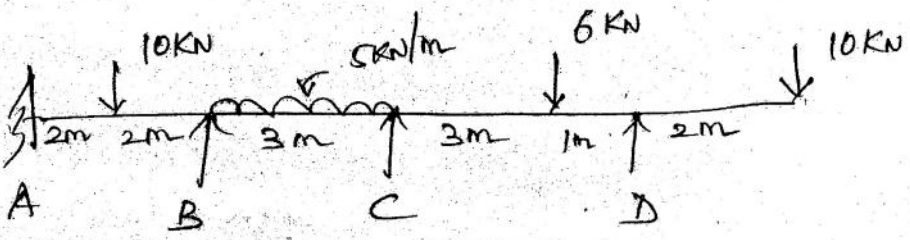

Figure-9

(OR)

10. Analyse the portal frame shown in figure-10 by stiffness matrix method.

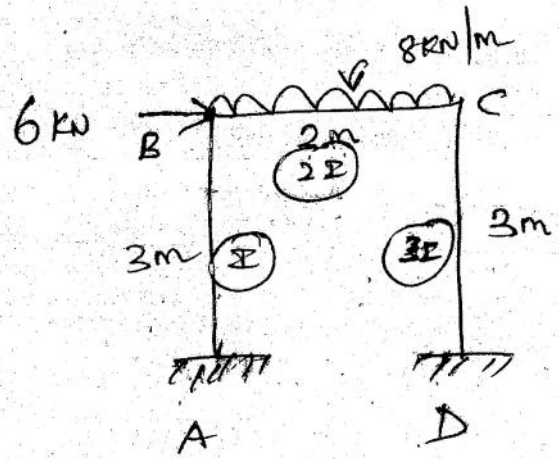

Figure-10.

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B.E. DEGREE EXAMINATION, 2016

(CIVIL AND STRUCTURAL ENGINEERING)

(SIXTH SEMESTER)

CSEC-604 / PCSEC-403. FOUNDATION ENGINEERING

(Common with Part-Time)

May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.

Use of necessary IS codes permitted.

UNIT – I

1. (a) (i) What are the principle modes of soil failure considered in bearing capacity analysis. (3)

(ii) A square footing 1·60 m size is placed at 2·10 m below the ground level in normally consolidated soft clay. The soft clay stratum is 6·30 m thick and is under lain by dense sandy stratum. Determine the safe bearing capacity of the footing and also, compute the settlement that would result due to the above safe bearing pressure is allowed to act on the footing. Water table is at the ground level.

Take C_u = 60 kN/m^2, Liquid limit = 32%,

Natural water content = 36%, Specific gravity = 2·65 and

angle of internal friction = 0°. (12)

(OR)

(b) (i) Define punching shear failure. (3)

(ii) Write the step by step procedure for IS code method of computing the bearing capacity of shallow foundation. (12)

UNIT – II

2. (a) (i) Write the use of Bore Log Report. (3)

(ii) Explain in detail the geophysical methods of soil exploration with neat sketches.(12)

(OR)

(b) (i) A sampler of inner diameter 35 mm and wall thickness 1 mm is used for sampling. Comment on the quality of sample. (3)

(ii) A square footing 1·2 m × 1·2 m rests at a depth of 1 m in a saturated clay layer 4 m deep. The clay is normally consolidated, having an unconfined compressive strength of 40 kN/m^2.

The soil has a liquid limit of 30% , γ_{sat} = 17·8 kN/m^3,

Water content = 28%, Specific gravity = 2·68.

Determine the load which the footing can carry safely with a factor of safety of 3 against shear. Also, determine the settlement of the footing, if loaded with this safe load. Use Terzhagi's analysis for bearing capacity. (12)

UNIT - III

3. (a) (i) Why weep holes are provided in retaining walls? (3)

(ii) A retaining wall 6 m high retains sand with ϕ = 30° and unit weight 24 kN/m^3 upto a depth of 3 m from top. From 3 m to 6 m the material is a cohesive soil with C = 20 kN/m^2 and ϕ = 20°, unit weight of cohesive soil is 18 kN/m^3. A uniform surcharge of 100 kN/m^2 acts on the top of soil. Determine the total lateral pressure acting on the wall and its points of applications. (12)

(OR)

(b) (i) What do you understand about plastic equilibrium in soil? (3)

(ii) A retaining wall is 4 m high. Its back is vertical and it has got sand backfill upto the top. The top of the fill is horizontal and carries a uniform surcharge of 85 kN/m^2. Determine the active pressure on the wall per metre length of wall. Water table is 1 m below the top of the fill.

Dry unit weight of soil is 18·5 kN/m^3.

Moisture content of soil above water table is 12%.

Angle of internal friction of soil is 30 °. Specific gravity of soil particle is 2·65.

Porosity of backfill is 30%.

The wall friction may be neglected. (12)

UNIT – IV

4. (a) (i) Write short notes on under-reamed pile and forces on the pile cap. (5)

(ii) A group of piles arranged in a square pattern with diameter and length of each pile as 30 cm and 12 m respectively, is used as a foundation in soft clay deposit. Taking the unconfined compressive strength of clay as 125 kN/m^2 and the pile spacing as 90 cm centre to centre, find the load capacity of the group. Assume the bearing capacity factor $N_c = 9$ and adhesion factor = 0·75. A factor of safety of 2·5 may be taken. (10)

(OR)

(b) (i) A wooden pile is being driven with a drop hammer weighing 20 kN and having a free fall of 1·0 m. The penetration in the last blow is 5 mm. Determine the load carrying capacity of the pile according to the engineering news formula. (5)

(ii) A 30 cm diameter pile of length 12 m was subjected to a pile load test and the following results were obtained :

Load (kN)	0	500	1000	1500	2000	2500
Settlement during loading (cm)	0	0·85	1·65	2·55	3·80	6·00
Settlement during unloading (cm)	4·00	4·60	5·20	5·50	5·80	6·00

Determine the allowable load. (10)

UNIT - V

5. (a) (i) Define amplitude. (3)

(ii) Bringout the IS code practice for designing the foundation for impact type of machines. (12)

(OR)

(b) (i) What are the forces acting on a wall foundation? (3)

(ii) A box Caisson is 20 m × 10 m × 15 m high. The weight of the Caisson is 15 MN and its centre of gravity is 6·4 m above the base. Check the stability of Caisson. If not suggest, how it can be made stable? The unit weight of water is 10·1 kN/m^3. A total load of 60 MN acting at an eccentricity of 0·20 m. If the base is at a depth of 13 m below water level, determine the net soil pressures. (12)

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B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-604 / PCLEC-503. FOUNDATION ENGINEERING

(New Regulations)

(Common with Part-Time)

May] [Time : 3 Hours

Maximum : 75 Marks

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

UNIT – I

1. (a) What are the types of foundation? Explain any one. (10)

   (b) A rectangular footing of size 4·0 m × 2·0 m carries a column load of 800 kN at a depth of 1·50 m. A footing rests on a soil having Poisson's ratio of 0·25 and Young's modulus of elasticity as 20000 kN/m^2. Calculate immediate elastic settlement of the footing. Consider influence factor as 1·52. (5)

(OR)

2. A rectangular footing 1·50 m × 2·10 m rests on a C-ϕ soil with its base at 1·65 m below the ground surface. Calculate the

   (a) Net ultimate bearing capacity and

   (b) Ultimate bearing capacity, using Terzhagi's analysis.

   Using a factor of safety of 3, the soil parameters are

   $\gamma = 18$ kN/m^2, C = 10 kN/m^2 and $\phi = 30°$.

   Take $N_c = 3720$, $N_q = 2{\cdot}50$ and $N_\gamma = 19{\cdot}70$. (15)

UNIT - II

3. (a) Calculate the area ratio, inside clearance and outside clearance, for the cutting edge internal diameter = 48 mm and external diameter = 51 mm. Sample tube internal diameter = 49 mm and external diameter = 50 mm. (5)

   (b) Explain the types of sampler. (10)

(OR)

4. (a) What are the causes for settlement? (3)

(b) What are the field tests that are normally used to determine the soil strength? Explain any two tests. (12)

UNIT - III

5. (a) Define retaining wall and its applications. (5)

(b) Design criteria of gravity retaining walls. (10)

(OR)

6. A counterfort wall of 8 m height retains a non-cohesive backfill. The void ratio and angle of internal friction of the backfil respectively are 0·70 and 30° in the loose state and they are 0·40 and 40° in the dense state. Calculate and compare active and passive earth pressures for both the cases. Take the specific gravity of solids as 2·70. (15)

UNIT - IV

7. Determine the load carrying capacity of

(a) Pile in cohesive soil. (b) Pile in non-cohesive soil by static formulae. (15)

(OR)

8. (a) List the classification of piles based on materials and compositions. (5)

(b) Design of friction pile group to carry a load of 3000 kN including the weight of the pile cap at a site where the soil is uniform clay to a depth of 20 m, underlain by rock. Average confined compressive strength of the clay is 70 kN/m^2. The clay may be assumed to be of normal sensitivity and normally loaded, with liquid limit 60%. A factor of safety 3 is required against shear failure. (10)

UNIT - V

9. (a) What are the tests conducted for determining the load carrying capacity of under reamed piles? (10)

(b) List the uses of under reamed piles. (5)

(OR)

10. (a) What is Cofferdams? (5)

(b) Explain the common types of Cofferdam with neat sketch. (10)

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Register Number:

Name of the Candidate:

B.E. DEGREE EXAMINATION, 201~~5~~6

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC–604 / PCLEC–503. SUB-STRUCTURE DESIGN

(Old Regulations)

~~November~~ May] [Time: 3 Hours

Maximum: 60 Marks

Answer any ONE FULL question from each unit

UNIT – I

1. Determine the depth at which a circular footing of 3.30m diameter be found to be provided to carry a safe load of 1500KN with a factor of safety 2.40. the foundation soil has C = 9KN/m^2, s = 18KN/m^2, Use Terzaghis analysis.

2. A raft foundation 10.5m wide and 12.30m long is to be constructed in a clayey soil having a shear strength of 11.40KN/m^2, Unit weight of soil is 18KN/m^3. IOf the ground surface carries a surcharge of 19.50KN/m^2. Calculate the maximum depth of foundation to ensure a factor of safety of 1.20 against base failure. Take Nc=5.70 for clay.

UNIT – II

3. a) Explain with neat sketch how wash boring is done.

   b) Distinguish between safe bearing capacity and allowable bearing capacity.

4. Describe in detail about standard penetration test.

UNIT – III

5. A vertical wall with vertical back is 9m high. The back fill has the following properties. ^{v}m = 16KN/m^3, $\theta = 30^0$, c = 12Kn/m2, $\delta = 20^0$. Assuming a sliding plane 60^0. To the horizontal, find the thrust on the wall under the condition, neglecting cohesion along the wall and neglecting any tension cracks.

6. Explain the Coulombs wedge theory of earth pressure with a neat sketch.

UNIT – IV

7. A reinforced concrete of size 30 × 30cm and 10m long is driven into a coarse sand, extending to a great depth. The average total unit weight of the soil is 18KN/m^3. And average value of N is 15. Determine the allowable load on the pile by static formula. Use Fs = 2.5, water table close to the ground surface.

8. Explain the various stages involved in the construction of under reamed pile foundation.

UNIT – V

9. a) Explain the procedure for construction of under reamed piles.

   b) Write the uses of under reamed piles.

10. Explain with sketches the various components of a well foundation.

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B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-605 / PCLEC-502. ENVIRONMENTAL ENGINEERING - I

May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.
Nomograph for Hazen William formula permitted.

UNIT – I

1. Discuss in detail about the various methods of forecasting population. (15)

(OR)

2. Discuss in detail the variation in demand and their effects on design of various components of water supply scheme. (15)

UNIT - II

3. What are intake structures? Enumerate the different types of intake structures with neat sketches. (15)

(OR)

4. What are the infiltration galleries and infiltration wells? Explain both with neat sketches. (15)

UNIT - III

5. Discuss the different types of pumps generally used in water supply schemes. (15)

(OR)

6. Explain the laying, joining and testing of pipes for water supply system. (15)

UNIT - IV

7. With the help of neat sketch, explain the working principle of rapid sand filter. (15)

(OR)

8. (a) Design a cirular sedimentation tank to handle 5·5 Million Litre Discharge (MLD) of water with detention time of five hours. (10)

   (b) Compare slow sand and rapid sand filter. (5)

UNIT - V

9. Illustrate the different layout of pipe systems in distribution of water. (15)

(OR)

10. Explain the Hardy cross method used for pipe network analysis in water supply system. (15)

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B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(SIXTH SEMESTER)

CLEC-606 / PCLEC-601. CONSTRUCTION TECHNIQUES AND MANAGEMENT

(Common with Part-Time)

May]

[Time : 3 Hours

Maximum : 75Marks

Answer any ONE FULL question from each unit.
EACH question carries FIFTEEN marks.

UNIT – I

1. (a) What materials are used to construct modern building? (3)
   (b) List the elements of pre-fabrication. (12)
2. (a) Classify pre-fabrication. (5)
   (b) Describe the problems based on erection of pre-cast units. (10)

UNIT - II

3. (a) Define open panel system. (5)
   (b) Describe the construction techniques used in industrial buildings. (10)
4. (a) Differentiate between earth hammer and excavator. (5)
   (b) State the use of a belt conveyor and what are the advantages of using wire ropes? (10)

UNIT - III

5. (a) List theorganization. (5)
   (b) State the function of construction management. (10)
6. Describe the method of executing work in PWD. (15)

UNIT - IV

7. (a) Write the different methods of scheduling. (5)
   (b) Describe the different methods of scheduling a construction project and explain the advantages and disadvantages of each. (10)

8. (a) What is critical path? (3)

(b) Find the latest allowable time for the events and prepare a time schedule and calculate float for each activity and show the critical path for the given network diagram (figure1). (12)

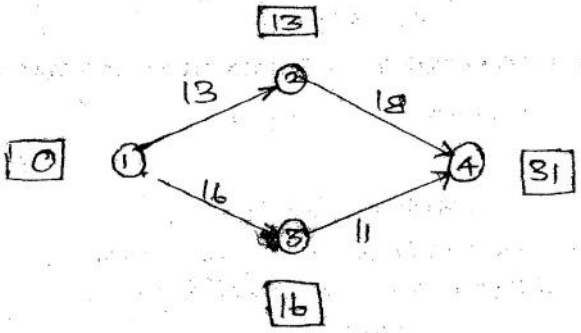

Figure-1

UNIT - V

9. (a) Draw a network diagram for the following logic :

Activities B and C depend upon activity A;

Activity D depends upon activity B ;

Activity E depends upon activity C and activity F depends upon actitivies D and E and activity G follows activity F. (5)

(b) Explain resources smoothing and resources levelling. (10)

10. (a) Write short notes on cost time optimization. (3)

(b) What different expenditures can come under direct and indirect cost? Discuss their relationship with time using graphs. (12)