Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018
Course Code: CE401
Course Name: - DESIGN OF STEEL STRUCTURES

Max. Marks: 100   Duration: 3 Hours

(Use of IS800, IS875, IS883 are permitted)

PART A
Answer any two full questions, each carries 15 marks.   Marks

1 a) Explain the failures of bolted joints.   (5)

  b) Design a lap joint between the two plates of width 150 mm, if the thickness of   (10)
      one plate is 12 mm and the other is 10 mm. The joint has to transfer a working
      load of 100 kN. The plates are of Fe 410 grade. Use bearing type bolts.

2 a) Write any six features of structural steel   (3)

  b) An ISMC 250 @ 298kg/m is used as a tie member to transmit a factored load of   (12)
      800kN. The channel section is connected to a gusset plate of 10mm thickness.
      Design a fillet weld if the lap length is limited to 300mm. Provide slot welds if
      required.

3 a) With the help of suitable diagram, explain the concept of shear lag.   (3)

  b) Design a suitable double angle section to carry a factored tensile load of 450 kN.   (12)
      The length of the member is 2.9m.Use M20 bolts of 4.6 grade. The grade of steel
      is Fe410.

PART B
Answer any two full questions, each carries 15 marks.

4 a) Design a built-up column consisting of two channels placed back to back to   (15)
      carry an axial factored load of 1900kN. Design bolted single lacing system also.
      Length of the column is 10m and both the ends of the column are effectively
      restrained in direction and position

5 a) Briefly describe the types of foundations used for columns.   (5)

  b) Design a gusseted base for a column ISHB 350 @72.4 kg/m with flange plates   (10)
      450 × 20mm carrying a factored axial force of 3000kN. The column rests on
      M20 grade concrete pedestal. Design the bolted connection also. Assume Fe 410
      grade steel and 4.6 grade bolts.

6 a) Distinguish between laterally restrained and unrestrained beams. (4)

   b) A conference hall 8mx12m is provided with a 120 mm RCC slab over rolled (11) steel I beams spaced 4m centre to centre. The super imposed load is $4kN/m^2$ and floor finish of $1.5 \ kN/m^2$. Design one of the beam as laterally supported.

PART C
Answer any two full questions, each carries 20 marks.

7 a) A roof truss shed is to be built in Chennai for an industry .The size of shed is (5) 20mx8m.The height of building is 10m at the eaves. Determine the basic wind pressure.

   b) A purlin is to be designed to support a GI sheet as roofing material for a truss (15) spaced at 3.5m c/c. purlin along the principal rafters are arranged at a distance of 1.35mc/c. The pitch of truss is 0.2m. Design a section for the purlin. Assume basic wind speed as 44m/s.

8   Design a fan type roof truss for a span of 9m, with 4m spacing, using GI sheets. (20) Slope of rafter 30^0. The wind pressure is $1.15kN/m^2$

9 a) Find the safe axial load of a column, made of salwood, of size 200mm x200mm (5) for inside location having an unsupported length of 5m

   b) What are the deflection considerations for the design of timber structures. (5)

   c) A flitched beam is made of timber joists 100mm x 220mm with a steel plate of size 20mm x 160mm placed symmetrically between them and firmly attached to both.. Calculate the moment of resistance of the combined section when the maximum bending stress in timber is $8N/mm^2$. Take Es= 20 Ew

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018
Course Code: CE403
Course Name: STRUCTURL ANALYSIS - III

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.

Marks

1   a)   What are the assumptions in cantilever method of analysis?   (2)

    b)   Analyse the frame shown in figure 1 using cantilever method. Cross-sectional area of   (13)
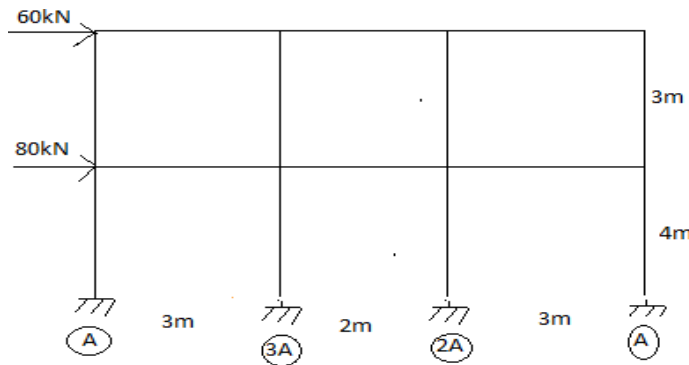members are shown in figure.

Fig
1

2   a)   Explain the formulae to find out the kinematic indeterminacy of pin-jointed and rigid-
jointed frames.   (5)

    b)   What is the relationship between stiffness and flexibility matrix   (5)

    c)   Compare nodal degrees of freedom and joint degrees of freedom.   (5)

3   a)   Define stiffness influence coefficients. Illustrate with suitable examples.   (5)

    b)   Explain the general procedure followed in displacement method of analysis   (7)

    c)   Define equilibrium and compatibility.   (3)

PART B
Answer any two full questions, each carries 15 marks.

4   a)   Discuss the formation of flexibility matrix for frame element   (10)

    b)   Discuss basic concepts of flexibility method   (5)

5 a) Derive the stiffness matrix for the structure with coordinates as shown in Fig.2.   (5)

Fig. 2

b   Analyse the rigid frame loaded as shown in Fig.3. using stiffness method   (10)

$E = 200 \times 10^{6} \, kN / m^{2}; I = 500 \times 10^{-6} \, m^{4}$
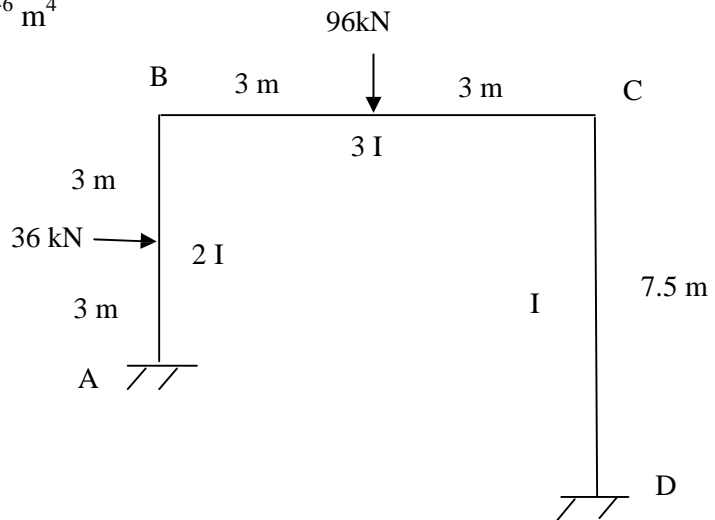

Fig.3

6 a) Explain how the effect of calibration error or temperature changes is considered in the   (5)
        analysis of trusses by matrix displacement method

   b) Find the forces in the members of the truss loaded as shown in Fig.4. using stiffness   (10)
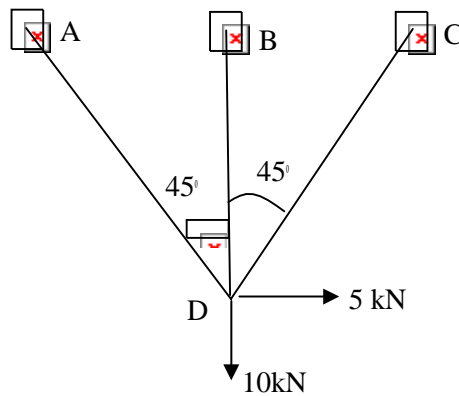   method. Take axial rigidity AE = unity for all members.

Fig. 4.

PART C
Answer any two full questions, each carries 20 marks.

7 a) Describe the stiffness matrix of elements in global coordinates from element coordinates   (5)

   b) Analyse the beam shown in figure 5 using direct stiffness method and draw the BMD   (15)
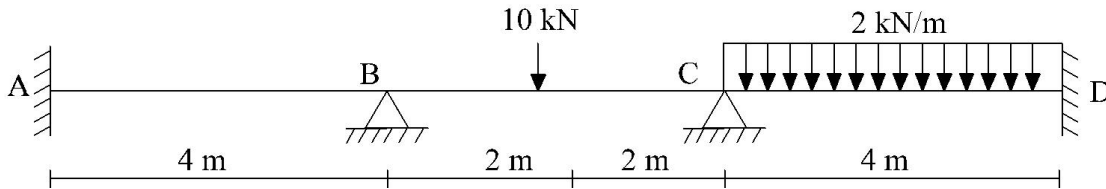

Fig 5

8 a) Explain the rotation of axes in 2 Dimensions   (5)

   b) An overhanging beam is shown in figure 6. Analyse the structure using Direct Stiffness   (15)
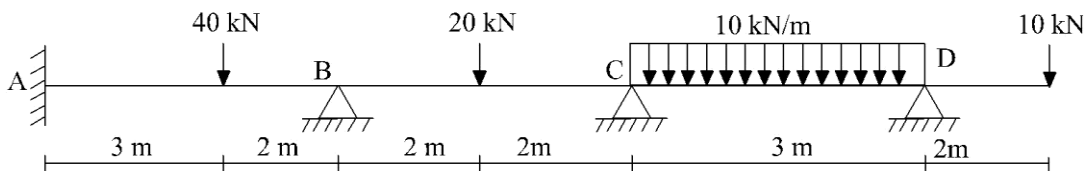   Method and draw BMD

Fig 6

9 a) Explain logarithmic decrement. Derive the equation for logarithmic decrement.   (5)

   b) Derive the response of the free vibration system with damped case and calculate the free   (15)
       vibration response of a SDOF system at time t=0.20 sec. for the following data
                 Natural frequency ω= 12 rad/sec
                 Damping coefficient ξ =0.15
                 Initial velocity=10 cm/sec
       Initial displacement=5 cm

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Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CE405
Course Name: ENVIRONMENTAL ENGINEERING- I

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.   Marks

1. a) What is fire demand? How will you calculate fire demand?   (5)
   b) Explain in brief different methods used for prediction of future population of a city.   (10)
2. a) What are the various factors affecting "per capita demand"?   (5)
   b) Explain Logistic curve method of population forecasting.   (10)
3. a) List out the different factors to be considered while selecting the location of an intake well.   (5)
   b) Describe the different methods for bacteriological analysis of water.   (10)

PART B
Answer any two full questions, each carries 15 marks.

4. a) Differentiate between Type 1 and Type II settling.   (4)
   b) Compare alum and iron salts as coagulants.   (4)
   c) Illustrate with a sketch, the different functional zones of a rectangular sedimentation tank.   (7)
5. a) Explain the procedure for determination of Optimum Coagulant Dosage by Jar Test with a neat sketch.   (7)
   b) Explain the theory of sedimentation.   (8)
6. Design a rapid sand filter for a total demand of 6 MLD of water with all its principal components.   (15)

PART C
Answer any two full questions, each carries 20 marks.

7. a) Explain the various methods of disinfection of water.   (8)
   b) Explain breakpoint chlorination and super chlorination.   (8)
   c) What is meant by fluoridation?   (4)
8. a) Explain the desalination process by electro-dialysis with neat sketch.   (5)
   b) Explain the types of aerators with suitable figures.   (10)

  c) Give an account on Adsorption.   (5)

9 a) The following pipe network consists of 5 pipes. The head loss in a pipe is given (20)
   by hf = X.Q^2. The values of X for different pipes and the flows at nodes are
   given in figure. Calculate the discharge in each pipe of the network.
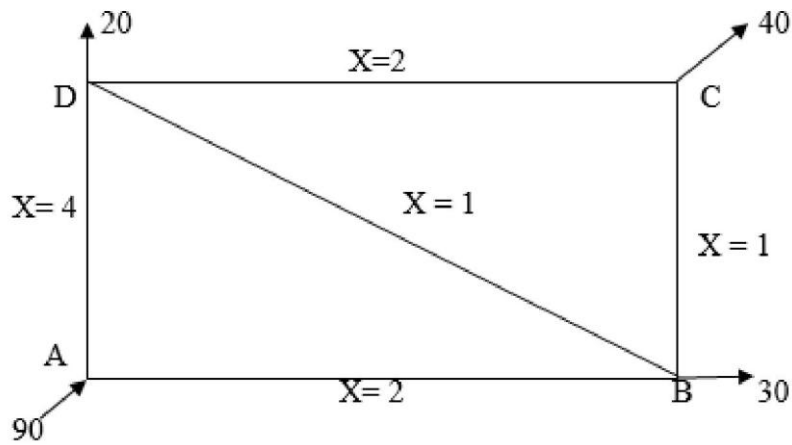
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Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018
Course Code: CE407
Course Name: TRANSPORTATION ENGINEERING - II

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.   Marks

1 (a) List and define the component parts of a railway track   (5)

   (b) Explain the functions and requirements of rails   (10)

2 (a) What is the equilibrium cant on a 2^0 curve on a BG track, if the speed of various trains are 10 trains at 50kmph., 8 trains at 55 kmph. and 4 trains at 60kmph. respectively   (5)

   (b) Explain the various type of gradient used on railway track? What is grade compensation and why is it necessary?   (10)

3 (a) Explain the term ballast less tracks and explain its advantages.   (4)

   (b) Enumerate the role of Indian railways in National development   (6)

   (c) What are the factors affecting the selection of gauges?   (5)

PART B
Answer any two full questions, each carries 15 marks.

4 a) What are the different types of signals according to location? Illustrate with the help of neat sketch   (5)

   b) How are railway stations classified? Explain each with neat sketches   (10)

5 a) Explain scissors crossover with neat sketch   (5)

   b) What are the different systems of controlling the movement of trains? Explain the working of absolute block system.   (10)

6 a) Discuss on Conventional and Advanced Remedial Aids for preventing railway accidents.   (4)

   b) Draw a neat sketch of a Left hand turnout and mark its components.   (6)

   c) Explain how the accidents are classified on Indian Railways.   (5)

PART C
Answer any two full questions, each carries 20 marks.

7 a) List the various methods of tunnelling in hard and soft rocks. Explain in detail any one tunnelling methodemployed in hard strata and soft soil   (10)

   b) Why shore protection works are necessary? Explain common forms of shore   (10)

         protection works

8   a)   Write notes on   (10)

              (i)   Lighting and Ventilation of tunnels

              (ii)   Lining of tunnels

      b)   State the natural and meteorological phenomena a harbour engineer has to study and briefly mention the effects of these phenomena   (10)

9   a)   What are the various forces acting on breakwater?   (5)

      b)   Distinguish between (i) Wharf and Pier (ii) Transit shed and ware house   (5)

      c)   Write down the procedure for constructing a tunnel in clayey soil. Explain its advantages.(Draw necessary diagrams)   (10)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018
Course Code: CE409
Course Name: QUANTITY SURVEYING AND VALUATION

Max. Marks: 100   Duration: 3 Hours

(Any missing data may suitably assumed)
PART A
Answer any two full questions, each carries 10 marks.   Marks

1 a) Briefly explain the detailed specification of Earthwork excavation for foundation in ordinary soil   (6)

   b) Write the unit of measurement of (i) Carpentry fittings (ii) Pointing of Brick wall   (4)

2   Work out the unit rate for P.C.C work in 1:6 Cement sand mortar For 10 m^3 (Broken stone 12.5 m^3 @800/ m^3, river sand 4.2 m^3 @1200/ m^3. Cement 1000kg @ Rs 8000/ ton, 12.5 mason @ Rs. 750/Each, 10.5 man @ Rs. 650 /Each and 11 woman @ Rs. 550/ Each).   (10)

3 (a) Calculate the amount required for carriage of 1500no's brick to be brought from a source of 12km away from the site. The vehicle access to the construction site is 60m away.   (6)

   CPWD data are as follows for mechanical transport of 1000nos of bricks at 1km@Rs.209.80; 2km@Rs.237.86; 5km@Rs.318.22; beyond 5km upto 10km per km @Rs.23.15; beyond 10km upto 20km per km @ Rs.19.0 ; and for transport of 1000nos of brick by manual labour Rs.216.40/- for first 50meters and Rs.47.12/- for every additional 50metre or part thereof. (All rate given are inclusive of profit & overhead)

   (b) What is mean by overhead charges? Give the percentage adopted for the contractor's profit and overhead in CPWD DSR 2016 rate analysis.   (4)


PART B
Answer any two full questions, each carries 25 marks.

4 a) Calculate the quantity of RCC and Prepare a bar bending schedule of the slab of size 330cm x 550cm (internal dimensions) shown in the figure. (All dimensions are in Centimetres)   (20)
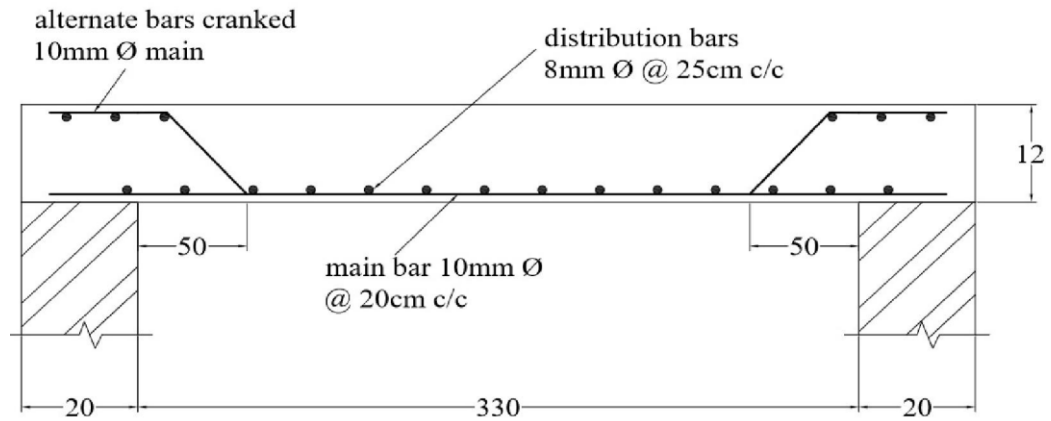
b) Calculate the quantity of Earth work, PCC and Brick work of a soak pit of internal diameter 1.5m and depth of 2.0m. Wall thickness 20cm and PCC thickness 15cm. (5)

5   Prepare detailed estimate for the following items of work for the construction of residential building (25)
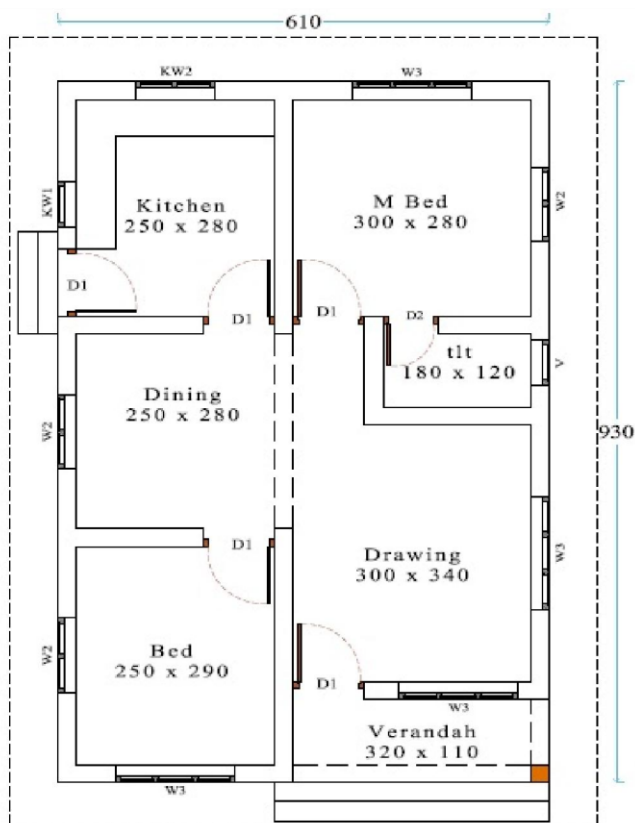
Prepare detailed estimate for the following items of work for the construction of

residential building

(a)   RRM for foundation (75cm x 75cm) and basement50cm x 50cm , Wall thickness 20cm

(b)   Quantity of earth filling inside the plinth

(c)   RCC works for slab (12cm thick), lintel (15cm thick), and sun shade (60cm projection).

(d)   Painting for walls, doors(D1-100x210; D2 80x210) and windows (W2-100x150; W3-150x150;KW1-50x100;KW2-100x100); V(90x60).

All dimensions are in centimetres. Any missing data may be suitably assumed.

6 a) Prepare a detailed estimate of brick work for a hexagonal building of internal side length 3.00m. wall thickness 40cm. All five sides are provided with window of size 110cm x 150cm and one side with a door of size 120cm x 210cm. Height of the wall 3.50. A all round lintel of 15cm thick was provided.   (5)

b) Estimate the quantity of earthwork for a portion of a district road for 400m length with following data. Formation width 10m side slopes in banking 2:1 , side slope in cutting 1.5:1, downward gradient is 1in200, formation level at chainage 0 in 150.000   (20)

Chainage	0	40	80	120	160	200	240	280	320	360	400
RL	149.0	148.90	148.50	148.80	148.60	148.70	149.20	149.40	149.30	149.0	148.60

PART C
Answer any two full questions, each carries 15 marks.

7 a) Discuss about different methods for finding valuation   (5)

b) A building is situated by the side of a main road of Mumbai city on a land of 500 sq m .The built up portion is 20m x 15 m.

The building is first class type and provided with water supply, sanitary and electrical fittings, and the age of the building is 30 years. Workout the valuation of the property.   (10)

8 a) Discuss about the different types of values and the term obsolescence   (7)

b) An old building has been purchased by a person at a cost of Rs. 30,000 excluding the cost of the land. Calculate the amount of annual sinking fund at 4% interest assuming the future life of the building as 20 years and the scrap value of the building as 10% of the cost of purchase.   (8)

9 a) Discuss the importance of valuation in civil engineering.   (7)

b) A three storied building is standing on a plot of land measuring 800 sq m. The plinth area of each storey is 400 sq m .The is on RCC framed structure and the future life may taken as 70 years , The building fetches a gross rent of Rs 1500 per month , work out the capitalized value of the property on the basis of 6% net yield .For sinking fund 3% compound interest may be assumed . Cost of the land may be taken as Rs 40 per sq m . The other data may assumed suitably   (8)

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Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CE465
Course Name: GEO-ENVIRONMENTAL ENGINEERING

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.
                                                                 Marks

1 a) Explain the soil- water-environmental interaction on geotechnical problems.   8

    b) What are the geotechnical properties of solid waste?   7

2 a) With neat sketch, write the multiphase behaviour of soil.   3

    b) Explain about the environmental impacts of waste dumping.   5

    c) List out and explain various waste management strategies.   7

3 a) What do you mean by Flyash? How will you obtain it?   5

    b) List out the geotechnical applications of Flyash.   5

    c) Write a short note on municipal solid waste.   5

PART B
Answer any two full questions, each carries 15 marks.

4 a) What are the major components of a landfill? Explain functions of each component.   8

    b) How will you evaluate the capacity of a landfill?   7

5 a) What are the basic functions of cover system?   3

    b) Explain with neat sketches the classification of landfill liners based on type of material.   6

    c) What are the various uses of gas collected from landfill?   6

6 a) How can we dispose leachate collected from a landfill?   8

    b) What are the different properties of geomembrane?   7

PART C
Answer any two full questions, each carries 20 marks.

7 a) Write in detail the approach for planning and implementing a successful remediation process.   6

    b) Write briefly about bioremediation.   10

    c)   List out different sampling techniques for contaminated soil.   4

8 a)   What are the advantages and disadvantages of ex-situ and insitu remediation approaches?   5

    b)   Explain the different methods of in-situ thermal desorption.   10

    c)   Write down the difference between thermal desorption and vitrificaton.   5

9 a)   Describe the effects of pollutants in soil on

       (i)   Index properties

       (ii)   Volume change behaviour   F

       (iii)   Shear strength

       (iv)   Permeability

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APJ ABDUL KALAM TECHNOLOGICAL
UNIVERSITY SEVENTH SEMESTER B.TECH DEGREE
EXAMINATION, DECEMBER 2018

Course Code: CE469
Course Name: ENVIRONMENTAL IMPACT ASSESSMENT

Max. Marks: 100   Duration:
3 Hours

PART A
Answer any two full questions, each carries 15 marks.   Marks

1	a)	Describe the various steps in EIA process with the help of a flow chart.	(12)
	b)	Explain the need for conducting Environmental Impact Assessment.	(3)
2	a)	Differentiate point and nonpoint sources of water pollution with examples?	(10)
	b)	Describe the impacts of any two water pollutants.	(5)
3		Explain in detail various control measures for three major air pollutants?	(15)

PART B
Answer any two full questions, each carries 15 marks.

4	a)	What is e-waste? Discuss the effects of E-waste on environment.	(6)
	b)	Explain in detail about noise pollution, its sources and effects	(9)
5	a)	List and explainany three sources of solid waste.	(10)
	b)	Discuss in detail about the ozone layer depletion.	(5)
6	a)	What are the impacts of deforestation?	(8)
	b)	What are the causes and effects of land degradation?	(7)

PART C
Answer any two full questions, each carries 20 marks.

7	a)	Explain in detail event tree analysis with an example	(10)
	b)	Explain matrix methods	(10)
8	a)	Discuss about the socio economic impacts associated with an airport project	(10)
	b)	Explain the advantages and disadvantages of (a) matrices and (b) overlays	(10)
9	a)	Explain any case study of EIA in detail	(10)
	b)	Explain standards for noise quality in detail	(10)

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