V.S.B. ENGINEERING COLLEGE, KARUR

Department of Civil Engineering

Academic Year: 2018-2019 (ODD Semester)

MA8353 - TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS - ASSIGNMENT QUESTIONS

1. Solve: $(x^2 - yz)p + (y^2 - zx)q = (z^2 - xy)$.

2. Solve : $p(1 + q) = qz$.

3. Find the general solution of $(z^2 - y^2 - 2yz)p + (xy + zx)q = (xy - zx)$.

4. Solve the Lagrange's equation $(x + 2z)p + (2xz - y)q = x^2 + y$.

5. Solve: $[D^2 - DD' - 2D'^2]z = 2x + 3y + e^{2x+4y}$.

6. Solve: $z = px + qy + p^2q^2$

7. Solve: $(D^3 + D^2D' - 4DD'^2 - 4D'^3)z = \cos(2x + y)$.

8. Find the complete solution of $p^2 + x^2y^2q^2 = x^2z^2$.

9. Solve: $(D^2 - D'^2)z = e^{x-y}\sin(2x + 3y)$.

10. Solve: $(D^2 + 2DD' + D'^2)z = 2\cos y - x\sin y$.

11. Find the Fourier series expansion of $f(x) = \begin{cases} x, & 0 \le x \le \pi \\ 2\pi - x, & \pi \le x \le 2\pi \end{cases}$ also deduce that

    $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots \infty = \frac{\pi^2}{8}$.

12. Find the Fourier series expansion the following periodic function of period 4

    $f(x) = \begin{cases} 2 + x, & -2 \le x \le 0 \\ 2 - x, & 0 < x \le 2 \end{cases}$.Hence deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots \infty = \frac{\pi^2}{8}$.

13. Solve: $(x^2 - yz)p + (y^2 - zx)q = (z^2 - xy)$.

14. Expand $f(x) = \begin{cases} 1 + \frac{2x}{\pi}, & -\pi < x < 0 \\ 1 - \frac{2x}{\pi}, & 0 < x < \pi \end{cases}$ as a full range Fourier series in the interval $(-\pi, \pi)$.

    Hence deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots \infty = \frac{\pi^2}{8}$.

15. Expand $f(x) = \begin{cases} -x, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$ as a full range Fourier series in the interval $(-\pi, \pi)$.

    Hence deduce the sum of the series $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots \infty$.

16. Obtain the Fourier cosine series expansion of $x\sin x$ in $(0, \pi)$. And hence find the value of $1 + \frac{2}{1.3} - \frac{2}{3.5} + \frac{2}{5.7} - \cdots \infty = \frac{\pi - 2}{4}$.

17. Obtain the Fourier cosine series of $f(x) = \begin{cases} kx, & 0 < x < \frac{l}{2} \\ k(l-x), & \frac{l}{2} < x < l \end{cases}$.

18. Find the complex form of the Fourier Series for the function $f(x) = e^{ax}$ in $-\pi < x < \pi$, where 'a' is a real constant. Hence deduce that $\sum_{n=-\infty}^{\infty} \frac{(-1)^n}{a^2+n^2} = \frac{\pi}{a \sinh a\pi}$.

19. Determine the first two harmonics of Fourier series for the following data.

x	0	$\frac{\pi}{3}$	$\frac{2\pi}{3}$	π	$\frac{4\pi}{3}$	$\frac{5\pi}{3}$
f(x)	1.98	1.30	1.05	1.30	-0.88	-0.25

20. Form the PDE by eliminating the arbitrary function 'f' and 'g' from $z = x^2 f(y) + y^2 g(x)$

21. Find the complete solution of $9 (p^2 z + q^2) = 4$.

22. Find the general solution of $(z^2-2yz-y^2)p+(xy+zx)q=xy-zx$

23. Solve $(D^3-2D^2 D')z = 2e^{2x}+3x^2 y$.

24. Solve $(r+s-6t)=y \cos x$.

25. Solve $(D^2+2DD'+D'^2-2D-2D')z = \sin(x+2y)$

26. Find a Fourier series with period 3 to represent $f(x) = 2x-x^2$ in $(0,3)$.

27. Find the Fourier series expansion of the periodic function $f(x)$ of the period 2 defined by

$f(x) = l-x$, $0<x\leq l$

$= 0$, $l<x\leq 2l$. in $(0,2l)$

28. Find the half range sine series of $f(x) = x \cos\pi x$ in $(0,1)$.

29. Find the half range cosine series expansion of $(x-1)^2$ in $0<x< 1$.

30. Find the complex form of the Fourier series $f(x)=e^{-ax}$ in the interval; $-\pi<x< \pi$.

31. Find the complete solution of $p^2 + x^2 y^2 q^2 = x^2 z^2$.

32. Find the Fourier series for the function $f(x) = |\sin x|$ over the interval $(-\pi,\pi)$.

33. Compute first two harmonic of the Fourier series for f(x) from the table below:(AU-A/M-2010)(8)

x :	0	60^0	120^0	180^0	240^0	300^0
y:	1.98	1.30	1.05	1.30	-0.88	-0.25

34. Solve the Lagrange's equation $(x + 2z)p + (2xz - y)q = x^2 + y$.

35. Solve: $[D^2 - DD' - 2D'^2]z = 2x + 3y + e^{2x+4y}$.

Find the Fourier cosine series up to third harmonic to represent the function given by the following table:

36.

x	0	1	2	3	4	5
y	4	8	15	7	6	2

37. Obtain the Fourier cosine series of $f(x) = \begin{cases} kx, & 0 < x < \frac{l}{2} \\ k(l-x), & \frac{l}{2} < x < l \end{cases}$.

38. Find the complex form of Fourier series of the function $f(x) = \sin x$ in $-\pi < x < \pi$

39. Find the complete solution of $p^2 + x^2 y^2 q^2 = x^2 z^2$.

40. Solve: $(x^2 - yz)p + (y^2 - zx)q = (z^2 - xy)$.

41. Find a Fourier series with period 3 to represent $f(x) = 2x - x^2$ in $(0,3)$.

42. Solve: $[D^2 - DD' - 2D'^2]z = 2x + 3y + e^{2x+4y}$.

43. Solve $(D^3 - 2D^2 D')z = 2e^{2x} + 3x^2 y$.

44. Solve $(r + s - 6t) = y \cos x$.

45. Find the half range cosine series expansion of $(x-1)^2$ in $0 < x < 1$.

Find the Fourier series expansion of the periodic function $f(x)$ of the period 2 defined by

46. $f(x) = l-x$, $0 < x \leq l$

      $= 0$, $l < x \leq 2l$. in $(0,2l)$

1. Important points for drawing shear force and bending moment diagram.
2. Graphical method for determining stresses on oblique section
3. Graphical representation of theories for two dimensional stress system.
4. Retaining walls
5. Thermal stresses in composite bars.
6. Write the expression for position of neutral axis in case of curved bars.
7. Which theory of failure is suitable for ductile and brittle materials?
8. Define volumetric strain.
9. Write down the winklersbach formula.
10. In a steel member, at a point, the major principal stress is 200MN/m^2 and the minor principal stress is compressive.If the tensile yield point of the steel is 235 MN/m^2. Find the value of the minor principal stress at which yielding will commence, according to each of the following criteria of failure. (i)Maximum shear stress. (ii)Maximum strain Energy and (iii)Maximum shear strain Energy.
11. Determine the flitched beam that having stress when its subjected to some loads.
12. Explain the Principle of superposition.
13. Derive the Strain energy due to impact loading.
14. Explain the Deflection of frames
15. Give the Introduction to column buckling.
16. Write the Application of williots mohr's diagram
17. What is the difference between internally and externally indeterminate structures?
18. Explain the Analysis of statically indeterminate structure by matrix force method.
19. List out the statically kinematically indeterminate structure.
20. Enumerate the Analysis of space and plane frames.
21. Briefly explain the Eulers theory of short column buckling
22. What are the Limitation of eulers theory?
23. How do Analysis of cylinder by using finite element method.
24. Explain Reliability analysis for eccentrically loaded columns.
25. What is the Application of theories of failure?
26. Give details about Column analogy method.
27. What is the Application of shear centre?
28. Write the Winkler Bach theory and its applications.
29. Comparison of stress between winklers bachs theory and finite element method.
30. Explain about the internal forces of the body.
31. State all the mechanical properties of materials.
32. Explain the various methods used for analyzing the beam and column.
33. Explain the Mohr's circle in graphical manner.
34. What do you mean by principal plane and normal plane? Explain in detail manner.
35. Share your idea on three dimensional state of stress at a point.
36. How the materials undergoes deformation due to the presence of impact load.
37. Discuss something about the deflections in beam.
38. Derive the relation between elastic constant.
39. Discuss briefly about the beams in tapered cross section.
40. Discuss briefly about Principal moments.
41. Explain the type of springs.

42. Draw the torsion moment diagram for all types of spring.
43. Determine the polar moment of inertia for members.
44. Design procedure of circular beams.
45. Explain the statically indeterminate beams working in pure torsion condition.
46. Explain the state of strain.

1. Explain the Applications of Fluid Mechanics in Engineering Projects.
2. Detailed notes on Capillary Action and Examples.
3. Measurement of low pressures using manometers.
4. Explain the term Surface Tension and its Practical Applications.
5. What are the Applications of Buoyancy and explain them?
6. Derive the Hagen poiseulle's equation and write the use of the equation.
7. What are the Applications of Pitot Tube in fluid mechanics?
8. Explain the Use of Fluid Mechanics in Civil Engineering.
9. What is the principle used for working of Venturimeter and Its Applications?
10. Application of laminar and turbulent flow.
11. The use of the Moody diagram in engineering.
12. Boundary Layer Control and Its Applications.
13. Explain the applications of Piezometer, Drag force in viscid flow.
14. Derive the Displacement thickness, Momentum thickness and Energy thickness.
15. Define Buckingham's 'π' theorem and explain the use of Buckingham's 'π' theorem in the dimensional analysis.
16. Obtain an expression for capillary rise of a liquid.
17. Define surface tension and obtain the relationship between surface tension and pressure inside a droplet of liquid in excess of outside pressure.
18. Give the definitions of metacentre and metacentirc height.
19. Derive the equation of continuity for three dimensional incompressible fluid flows and reduce it to one dimensional form.
20. What is a flow - net? Enumerate the methods of drawing flow nets. What are the uses and limitations of flow nets?
21. Derive Euler's equation of motion along a stream line and hence derive the Bernoulli's theorem.
22. Derive the Hagen - Poiseuille equation and state the assumptions made.
23. Briefly explain about Moody's diagram, pipe roughness.
24. State Bernoulli's theorem for steady flow of an incompressible fluid.
25. Explain briefly pipe network.
26. Derive an expression for the calculation of loss of head due to
(i) Sudden enlargement (ii) Sudden contraction
27. Explain the Reynolds's law of similitude and Froude's law of similitude.
28. State the reasons for constructing distorted models. What are the merits and demerits of distorted models as compared to undistorted models?
29. Principle, types and working of Manometer.
30. What are the types of lines with an example?
31. How to determine the pipe friction?
32. Differentiate laminar and turbulent flow.
33. What are the applications of flow net?
34. Give experimental verification to determine pipe roughness.
35. Write the methods to prevent boundary layer separation.
36. Briefly explain the terms distorted models and undistorted models.
37. Why should we use hydraulic gradient line and total energy line?

38. What r the dimensional numbers and where it can be applied?
39. What are the methods to determine the metacentric height?
40. What are the application of darcy weisbach's equation?
41. Give your own idea about jet propulsion.
42. Write your opinion about model studies.
43. Why fluid is considers as a continuum?
44. Write the momentum equation and its application to pipe bent.
45. Power transmission through pipe and its losses.
46. What are the scale effects in models?

V.S.B. ENGINEERING COLLEGE, KARUR
DEPARTMENT OF CIVIL ENGINEERING
Academic Year: 2018 -2019 (ODD Semester)
CE8392 – ENGINEERING GEOLOGY –
ASSIGNMENT QUESTIONS

1. Give details on geological work of atmosphere with photos and pictures.
2. Give details on geological work of glacier with photos and pictures.
3. Enumerate the causes of folding and types of folds with pictures and photos.
4. Enumerate the effects of faulting and engineering considerations of faults with photos and pictures.
5. Give detail about the occurrence of joints and engineering considerations with photos and pictures.
6. Elucidate the formation of minerals and list out the minerals found in India with pictures and photos.
7. Explain about the composition and texture of igneous rocks. Give an account of important igneous rocks found on earth with pictures and photos.
8. Give an account of the following with relevant pictures and photos:
    (i) Mode of formation of sedimentary rocks
    (ii) Structures of sedimentary rocks
    (iii)Important sedimentary rocks found in nature.
9. Give an account of metamorphism and their factors. Also explain the structures of metamorphic rocks with required pictures and photos.
10. List and account various metamorphic rocks found on the earth with pictures and photos.
11. Explain the origin of ore deposits with suitable examples and appropriate pictures.
12. Give an account of minerals resources of India with pictures.
13. Enumerate the sources and zonal distribution of groundwater in India.
14. What are the water bearing qualities of rock? Give explanation on types of aquifer and aquifer functions.
15. Describe how different rocks act as aquifers?
16. Give details on earthquake resistant buildings.
17. Write detail note on types of dams with necessary diagrams and pictures.
18. Write detail note on types of reservoirs with necessary diagrams and pictures.
19. Write detail note on types of tunnels with necessary diagrams and pictures.
20. Explain rocks as materials of construction.
21. Give an elucidation of mountains with examples, pictures and photos.
22. Give an elucidation of valleys with examples, pictures and photos.
23. Give an elucidation of lakes with examples, pictures and photos.
24. What are special geologic hazard studies? Explain.
25. Give an account of the requisitions of a geotechnical report.
26. Explain about instrumentation and monitoring in geological investigations.
27. Describe the method of geological investigation.
28. Detail about instrumentation and monitoring in geological investigations with pictures and photos.
29. Elaborate on the geological hazards in detail with pictures and photos.
30. Give an account of recent geological discoveries and hypotheses with photos and pictures.
31. Write about famous geologists and their contributions to geology.
32. Give the civil engineering applications in geology.
33. Bring out the earthquake disaster with case study.
34. Explain the geological action of ground water.
35. Explain different group of minerals with its uses.

36. Briefly give the origin of different types of rocks.
37. Elaborate the engineering properties and uses of different mineral kingdom.
38. Give the engineering properties of different rocks.
39. Explain the laboratory tests for rocks.
40. Briefly explain about the economic properties of different rocks.
41. Write the geological methods foe subsurface investigation.
42. Discuss about the classification of faults in different rocks.
43. Discuss about the classification of folds in different rocks.
44. Give the applications of remote sensing technology in civil engineering.
45. Enumerate the landslide disasters with case study.
46. Elaborate the coastal disaster with case study.

1. Can you suggest the brick manufacturing companies in Tamilnadu?
2. Explain the various types of Modern Constructions in India.
3. What are the types of Modern Construction materials are used in Construction?
4. Write the special features of kallanai dam.
5. Explain the various types of Artificial stones?
6. What is the application of using tiles instead of Marble?
7. What is the applications high volume Light weight concrete?
8. What is the application of Acid brick? where it can be used?
9. Explain the manufacturing process of light weight concrete and GGBS concrete.
10. Write about Specially shaped bricks.
11. What are the applications of timer construction?
12. What are the properties of Glass?
13. What are the advantages of precast concrete members?
14. Explain about single design model in construction.
15. Create your own idea on the smart structures.
16. Can you apply your thoughts on the ways that you can manage the quality of construction?
17. Explain briefly about the different types of articulated structures with suitable examples.
18. What are the real world problems on shortage of construction materials and what will be the solution?
19. Write the special features of Meenatchiamman temple in relating with construction materials?
20. Share your idea about in the system of construction
21. Can you suggest the cement manufacturing companies in India?
22. Share your ideas about protective materials.
23. Explain the types of mixer and machines are used in construction.
24. Explain the various types of cements available in the market.
25. Visualize a cement manufacturing plant and draw it briefly with all the processes.
26. What do you prefer a ready mix concrete or site manufactured concrete? Place your views regarding the same.
27. What are pollution problems that arise due to the cement manufacturing plant and how can you rectify it?
28. Pen your views on the different admixtures available and arrange them according to their usage.
29. Explain the green building concept of the building construction.
30. When can you think our country will be the one of the greatest infrastructure developed country in the world and what are the ideas you can place?
31. Explain any one type of flooring with a neat example.
32. Compare and contrast the stone and brick masonry in a brief manner.
33. Why dampness is caused in the building and how can you rectify it?
34. Explain about various types of roofing normally used for construction.
35. Where the hot weather concreting practiced in the world and explain their difficulties shortly?
36. Which is stronger? A ready mix concrete or a manufactured concrete at the site.
37. Say in detail about the advantages of brick masonry over the stone masonry.
38. Put in your own words about the Temporary structure .
39. Explain in detail about Hydration process of cement.

40. What type of bond is mostly practiced in India and state your reasons.
41. Can you suggest replacement of aggregates by any other material?
42. What are the different types of foundation you know and explain with neat drawings?
43. Explain different types of wood used for construction practices.
44. Why ethics are very important to civil engineers?
45. Write the importance of construction management? How it can be improved?
46. Apply your thoughts on construction waste management.

1. Write the difference between a map and a plan.
2. Who are Leader and follower when a line is being chained?
3. Name some of the accessories used in plane tabling.
4. What is the use of trough compass in plane table surveying
5.   Explain different corrections that can be applied to chain or tape
6.   Mention the instruments for chaining?
7.   Explain intersection & radiation method of plane tabling?
8. Explain about characteristics of contours.
9. Explain about Precise levelling and its difficulties in levelling.
10. List the uses of contours and where it will used?
11. Explain the temporary and permanent adjustments of a dumpy level.
12. The following consecutive readings were taken along AB with a 4m leveling staff on continuously slowing ground at intervals of 20m: 0.34m on A, 1.450, 2.630, 3.875, 0.655, 1.745, 2.965, 3.945, 1.125, 2.475, 3.865 on B. The elevation A was 60.350. Enter the above readings in a level book form and work out RLs by rise and fall method. Also find the gradient of the line AB?

13. The following perpendicular offsets were taken at 10 meters intervals from a survey line to an irregular boundary line. 3.25,5.60,4.20,6.65,8.75,6.20,3.25,4.20,5.65. calculate the area using average ordinate rule, trapezoidal rule and simpson's rule?
14. What are the different methods used to find the elevations of the points in the case of inaccessible points? Differentiate that?
15. What are the three types of telescopes used in stadia surveying
16. Explain movable hair method?
17. What is mean by tacheometric surveying and uses of tacheometric surveying
18. What kind of error can be eliminated by taking face left and face right observations?
19. Explain face left and face right observations in Theodolite traversing?
20. What you mean by temporary adjustments of a Theodolite?
21. What is transit Theodolite and where we are using the transit theodolite?
22. List out the major parts of a Theodolite.
23. What are the two methods of measuring the horizontal angle using a Theodolite? When each method is advantageously used?
24. Explain the different between tangential and stadia tacheometry. How will you determine the stadia constants?
25. A tacheometer is setup at an intermediate point at on a traverse course PQ. The Following observations are made on the vertically held staff.

Staff Station	Vertical Angle	Staff Intercept	Axial Hair reading
P	8°36'	2.350	2.105

Q	6°6'	2.055	1.895

The Instrument is fitted with an analytic lens and the constant is 100- computethe length of PQ and R-C of Q that of P being 321.5m.

26. Explain any four applications of Triangulations.
27. Explain the procedure of site selection of Tower and signal.
28. What is reciprocal levelling and why is it employed? What errors will be eliminated?
29. Explain the applications of Total station and its uses.
30. Explain conventional methods and its applications.
31. Explain non- conventional methods and its applications.
32. Explain briefly the components of GPS?
33. Comparison between the old methods and Modern methods in surveying.
34. Explain the application of remote sensing.
35. Explain the concept of Geographic Information System.
36. Explain the current surveying technologies and methodology.
37. List out the types of GPS and its applications.
38. Explain the satellite image and its uses in surveying field.
39. Write short notes on recent technology in Theodolite.
40. Explain the steps to measure the quadrilateral angles.

41. The following offsets were taken from a chain line to a hedge. Distance in m 0 6 12 18 24 36 48 60 72 81 90 Offsets in m Calculate the area using (i) Simpson's rule (ii) trapezoidal rule.
42. Certain field has three straights sides PQ, QR, RS and an irregular side PS. Calculate the area of the field from the following data. PQ = 130m, QR =200m, PS = 150m, PR = 230m. Offset taken outwards from PS to the irregular boundary at chain ages 0, 30, 60, 90, 120 and 150 Have values 0, 3.2, 1.6, 6.8, 4.0 and 0 .
43. The following perpendicular offsets were taken at 10 meters intervals from a survey line to an irregular boundary line. 3.25,5.60,4.20,6.65,8.75,6.20,3.25,4.20,5.65. Calculate the area using average ordinate rule, trapezoidal rule and simpson'srule.
44. A railway embankment is 10m wide with side slopes 2:1. Assuming the ground to be level in a direction traverse to the centerline, calculate the volume contained in a length of 150m, the central heights at 30m intervals beings 2.5, 3.00, 4.00, 3.75, and 2.75 respectively.
45. A tacheometer is setup at an intermediate point at on a traverse course PQ. The Following observations are made on the vertically held staff. Staff Station Vertical Angle Staff Intercept Axial Hair reading P 8°36' 2.350 2.105 Q 6°6' 2.055 1.895 The Instrument is fitted with an analytic lens and the constant is 100- compute the length of PQ and R-C of Q that of P being 321.5m.
46. Calculate the horizontal and vertical distances using tangential tacheometry when both the observed angles are angle of elevation and angle of depression.