B.L.D.E.A's V.P.Dr.P.G.HALAKATTI COLLEGE OF ENGINERING AND TECHNOLOGY VIJYAPUR 586103

INDEX FILE 3rd SEMESTER QUESTION PAPERS JAN/FEB 2023

Civil

Civil Department III Semester

21 IIISem CV

CBCS SCHEME

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21CV32

Third Semester B.E. Degree Examination, Jan./Feb. 2023
Geodetic Engineering

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define Surveying. Explain the basic principles of surveying with neat sketches. **(06 Marks)**

b. Differentiate between Plane and Geodetic Surveying. **(06 Marks)**

c. Calculate the interior angles of the following traverse ABCDEA. Apply check and plot the traverse (not to scale).

Line	AB	BC	CD	DE	EA
FB	60° 30'	122° 0'	46 ° 0'	205° 30'	300° 0'

(08 Marks)

OR

2 a. Distinguish between :
i) True meridian and Magnetic meridian.
ii) Whole circle bearing and Quadrantal bearing system. **(06 Marks)**

b. Explain Radiation and Traversing methods of plane table surveying with sketches. **(09 Marks)**

c. What are the advantages and disadvantages of Plane table surveying? **(05 Marks)**

Module-2

3 a. What are the general methods of determining the area? **(05 Marks)**

b. Write short notes on Digital Planimeter. **(05 Marks)**

c. The following staff readings were taken with a level , the instrument having been moved after third, sixth and eighth readings.
2.225 , 1.625, 0.985, 2.095, 2.795, 1.265, 0.605, 1.980, 1.045 and 2.685m.
Enter the above readings in a page of level book and calculate the RL of points. The first reading was taken on a benchmark of RL 100.00m. Use H.I method. **(10 Marks)**

OR

4 a. Define the following terms :
i) Bench mark ii) MSL iii) Turning point iv) Fore sight v) Reduced level. **(05 Marks)**

b. Explain Fly Leveling, with neat sketch. **(05 Marks)**

c. The following perpendicular offsets were taken at 10m 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 , 5.65m.
Calculate the area enclosed between the survey line , the irregular boundary line and the first and last offset by the application of i) Average ordinate rule ii) Trapezoidal rule iii) Simpson's rule. **(10 Marks)**

Module-3

5 a. Define the following : i) Face left ii) Transiting iii) Swinging iv) Trunnionaxis. **(04 Marks)**

b. Explain the Measurement of Horizontal angle by Repetition method. Draw typical tabular column. List the errors eliminated by this method. **(08 Marks)**

OR

4 a. Establish a relationship between SF, BM and intensity of loading. **(04 Marks)**

b. Draw SFD and BMD for a cantilever beam shown in Fig.Q4(b).

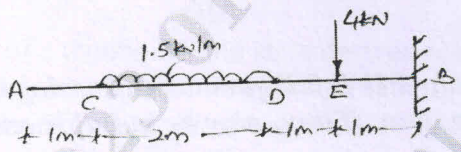

Fig.Q4(b) **(06 Marks)**

c. A beam AB is loaded as shown in Fig.Q4(c). Plot SFD and BMD.

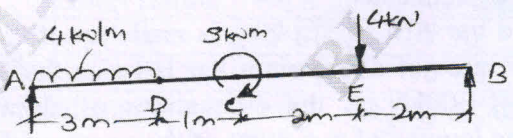

Fig.Q4(c) **(10 Marks)**

Module-3

5 a. List the assumptions made in simple theory of bending. **(04 Marks)**

b. Establish a relationship between moment and radius of curvature. **(06 Marks)**

c. A 1m long cantilever beam with T – section is subjected to a point load of 10kN at its free end the size of the flange is 140 × 10mm and overall depth of section is 150mm. Thickness of web is 10mm. Determine the maximum tensile stress and maximum compressive stress induced in the section and draw bending stress distribution. **(10 Marks)**

OR

6 a. Derive an expression to determine shear stress for a triangular section. **(08 Marks)**

b. The unsymmetrical I – section shown in Fig.Q6(b) is subjected to a shear force of 40kN. Draw the shear stress variation diagram across the depth.

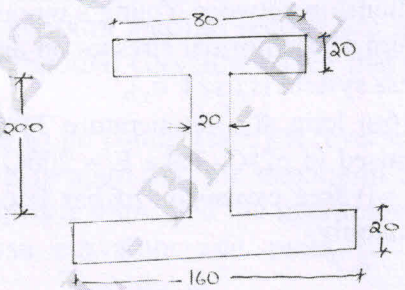

Fig.Q6(b) **(12 Marks)**

Module-4

7 a. Explain the concept of pure torsion and list the assumption in developing the theory of pure torsion. **(05 Marks)**

b. The diameter of water pipeline is 750mm. It has to withstand a water head of 60m. Find the thickness of seamless pipe if principal stress is $20N/mm^2$. Take unit weight of water as $9810N/m^3$. **(05 Marks)**

c. A thick cylindrical pipe with outside diameter and internal diameter 200mm is subjected to an internal fluid pressure of $14N/mm^2$. Determine the maximum hoop stress developed in the cross section. Sketch the variation of hoop stress across the thickness of pipe. What is the percentage error, if the maximum hoop stress is found from the equation of these pipes? **(10 Marks)**

OR

8 a. Derive a torsional equation with a neat sketch. **(08 Marks)**

b. A hollow propeller shaft of a fishing boat is to transport 3750KW@ 240rpm if the internal diameter is 0.8 times the external diameter and if the maximum shear stress developed is to be limited to $160 N/mm^2$. Determine the size of the shaft. **(12 Marks)**

Module-5

9 a. List the various assumptions to derive the expression for buckling load for long column. **(04 Marks)**

b. Derive an expression to determine buckling load for column when one end is fixed other end is hinged. **(06 Marks)**

c. A hollow cast iron column whose outside diameter is 200mm and thickness is 20mm is 4.5m long and is fixed at both ends. Calculate safe load by Rankine's formula using factor of safety 2.5. Find ratio of Euler's to Rankine's rule. Take modulus of elasticity as $1 \times 10^5 N/mm^2$; Rankine's constant $\frac{1}{1600}$ for both ends fixed case and $f_c = 550 N/mm^2$. **(10 Marks)**

OR

10 a. Derive a deferential equation for deflection using standard notation using neat sketch. **(08 Marks)**

b. An overhanging beam ABC supported at A and B is loaded as shown in Fig.Q10(b). Determine the deflection at free end C and the maximum deflection between A and B. Take $\varepsilon = 200 kN/mm^2$, $I = 45 \times 10^6 mm^4$.

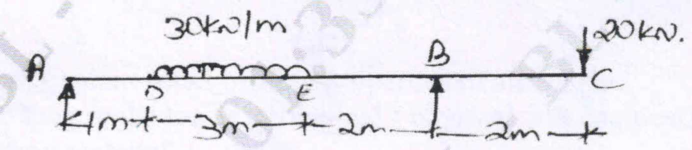

Fig.Q10(b) **(12 Marks)**

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CBCS SCHEME

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21CV34

Third Semester B.E. Degree Examination, Jan./Feb. 2023
Earth Resources and Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Write neat sketches wherever necessary.

Module-1

1 a. Explain the scopes and role of Earth Science in civil engineering. **(06 Marks)**
b. Discuss the causes of earthquake and add a note on earthquake resistant structure. **(08 Marks)**
c. What is plate tectonics? Explain different types of plate boundaries. **(06 Marks)**

OR

2 a. Explain causes, effects of volcanoes and its types. **(05 Marks)**
b. What is landslide? Explain the causes and its remedial measures. **(10 Marks)**
c. What is Tsunami? Explain the causes and add a note on methods of mitigation. **(05 Marks)**

Module-2

3 a. Define a mineral. With suitable examples, explain classification of minerals. **(04 Marks)**
b. Describe the following minerals for its physical properties, occurrences and industrial uses.
i) Quartz ii) Gypsum iii) Magnetite **(12 Marks)**
c. What are the qualities or index properties of rocks for civil engineering projects? **(04 Marks)**

OR

4 a. What is an aquifer? Explain water bearing properties of an aquifer. **(06 Marks)**
b. Describe the following rocks for its geological / physical and engineering properties and its suitability as building material:
i) Granite ii) Lime Stone **(08 Marks)**
c. Explain different types of Textures in the igneous rocks. **(06 Marks)**

Module-3

5 a. What is weathering? Briefly explain types of Chemical weathering and its impact on monumental rocks. **(06 Marks)**
b. Explain soil profile and add a note on geological classification. **(08 Marks)**
c. What is a dam? Explain different types with examples and criteria for selection of site for dam construction. **(06 Marks)**

OR

6 a. What is the concept of interlinking of river? Add a note on its benefits and environmental impact. **(06 Marks)**
b. Explain silting in Dam / Reservoir and its control. **(08 Marks)**
c. What are the criterias for selection of sites for artificial recharge? **(06 Marks)**

Module-4

7 a. Explain the principle of Electrical resistivity method and with neat sketch describe the function of Resistivity meter. **(06 Marks)**

b. Explain the recognition of folds and faults in field and list their importance in civil engineering project. **(08 Marks)**

c. A bed of shale is dipping maximum of 32° along S45°E. Find the amount of its apparent dip along S80°E and state the strike. Write the procedure (Solve by Graphical / Trigonometric method). **(06 Marks)**

OR

8 a. Explain seismic method and its application in civil engineering. **(06 Marks)**

b. List and explain ground improvement techniques. **(06 Marks)**

c. Three test boreholes (X, Y and Z) drilled in a dry tank bed at three points of an equilateral triangle whose sides are 450m each. The point 'X' is west of 'Y' and the point 'Z' is north of mid point between X and Y. The boreholes X, Y and Z intersects a limestone bed at a depth of 20m, 110m and 170m respectively. Determine

i) The attitude (Dip and Strike) of the Limestone bed

ii) Another borehole (P) is prosed exactly at mid point of Y and Z. Determine at what depth, the new borehole meets the upper bedding plane of the Limestone bed. **(08 Marks)**

Module-5

9 a. Discuss the principle of Remote Sensing and its application in Civil Engineering. **(08 Marks)**

b. Explain flight planning for taking aerial photos. **(08 Marks)**

c. Explain application of GPS and GIS in Civil Engineering. **(04 Marks)**

OR

10 a. Define photogrammetry. Explain the field of applications of photogrammetry. **(10 Marks)**

b. What is toposheet? Explain the importance of toposheet and how it differ from outer resource maps. **(10 Marks)**

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CBCS SCHEME

21CV383

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Question Paper Version : D

Third Semester B.E. Degree Examination, Jan./Feb. 2023
Personality Development and Soft Skills

Time: 1 hr.] [Max. Marks: 50

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **fifty** questions, each question carries one mark.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

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1. The forms of oral communication is
   a) Face to face
   b) By voice mail
   c) Though an intercom and telephone
   d) All the above

2. Body language is the most common types of
   a) Verbal message
   b) Non verbal message
   c) Formal message
   d) Informal message

3. Who is the principal in the communication model?
   a) Sender
   b) Receiver
   c) Mediator
   d) Listener

4. The sequence of communication model is
   a) Sender, Feedback, Message, Receiver
   b) Receiver, Sender, Message, Feedback
   c) Feedback, Receiver, Sender, Message
   d) Sender, Message, Receiver, Feedback

5. Active listening means
   a) Understand the things
   b) Plying close attention to the person who is speaking to you
   c) Paying close attention to the person who is responding to you
   d) None of the above

6. Email etiquette includes
   a) Language
   b) Structure
   c) Grammar
   d) All the above

7. Public speaking is the act of presenting an ideal to the
   a) Individual b) Group
   c) Public d) Private

8. Communication Skills involve
   a) Listening b) Speaking
   c) Observing and empathizing d) All the above

9. Competitive listening happens
   a) Promoting other points of view
   b) Promoting out won point of view
   c) Criticizing other point of view
   d) Criticizing our own point of view

10. Reading develop art of
    a) Creativity b) Distraction c) Upset d) Interrupting

11. Good time management leads to improved
    a) Inefficiency b) Less productivity
    c) More stress d) High productivity

12. Poor time management leads to
    a) Good work flow b) Waste of time
    c) Good control d) Efficiency

13. Manner means polite behavior of an individual that show attitude of compassion kindness, respect and consideration for others
    a) Poor attitude b) Rude
    c) Disrespect d) attitude of compassion

14. Body language is the use of
    a) Physical behavior b) Attitude
    c) Politeness d) None of the above

15. Body language is a
    a) Verbal signals b) Non-verbal
    c) Verbal and non-verbal d) None of the above

16. Effective stress management is helps you to
    a) Break the hold stress has on your life
    b) Hot break the hold stress has on your life
    c) Increase humiliation
    d) All the above

17. Stress management is a wide spectrum of techniques of
    a) Mental attitude b) Psychotheropies c) Physical attitude d) None of the above

18. Stress is
    a) Objective b) Subjective c) All the above d) None of the above

19. Yoga helps to reduce
    a) Stress b) Unhappiness c) Poor concentration d) More anxiety

20. Stress can be a
a) Short–term issue
b) Long term - issue
c) Both short term and long term issue
d) No issue at all

21. Group discussion is a type of discussion that involves
a) People sharing ideas
b) People sharing activities
c) People Sharing throughts
d) All the above

22. Discussion means
a) Exchanging ideas between two or more than two people
b) Exchange ideas themselves
c) Exchanging ideas between two people only
d) Exchanging thoughts

23. The group discussion judge in named as
a) Mediator b) Facilitator c) Leader d) Panelist

24. Process of group discussion is
a) Topic announcement, preparation time lead starts discussion followed by other participants, GD summarization, Judgement of individual performance,
b) Preparation time, lead starts discussion followed by other participants topic announcement GD summarization, Judgement of individual performance
c) Judgeemnt of individual performance, Topic announcement preparation time, lead starts discussion followed by other participants. GD summarization
d) Lead starts discussion followed by other participants. GD summarization Judgements of individual performance topic announcement.

25. Group discussion help to understand the students
a) Behavior b) Attitude c) Efficiency d) All the above

26. Which of these qualities are important in a group discussion
a) Emotional stability
b) Hostility
c) Ignorance
d) Aggressiveness

27. In a group discussion, one must communicate with
a) Hostility b) Assertive c) Knowledge d) Attitude

28. In a group discussion, we should be
a) Dominating b) Subjective c) Assertive d) Ignorant

29. In group discussion, the discussion must be directed to its reasonable conclusion
a) True b) False

30. Public speaking is also called oratory
a) True b) False

31. Interpersonal relationship involves
    a) Social associations
    b) Connections
    c) Application
    d) None of the above

32. Relationship can develop
    a) In a group
    b) In an individual
    c) In a team
    d) All of the above

33. Team-building exercises aim
    a) To expose and address interpersonal problem within the group
    b) To expose and address interpersonal problems outside the group
    c) To expose and address personal problems
    d) To expose and address other problems

34. Team building is one of the most widely used
    a) Individual development activities in organization
    b) Group - development activities in organization
    c) Personal development activities in organization
    d) None of the above

35. Team – development activities, including
    a) Individual activities
    b) Team building
    c) Team Training
    d) Both B and C

36. Group formation starts with a
    a) Psychological bond between groups
    b) Psychological bond within individual
    c) Psychological bond individuals
    d) None of the above

37. Networking is the ability
    a) To exchange information and ideas with individual and groups
    b) To exchange information with individual
    c) To exchange information with groups
    d) To exchange ideas with someone

38. Problem solving is a
    a) Define the problem
    b) Generate new ideas
    c) Implement evaluate and select solution
    d) All the above

39. Problem solving technique leads to
    a) Solution
    b) Identification of problem
    c) Analyse the problem
    d) None of the above

40. A strong bond between two or more people refers to
    a) Personal relationship
    b) Individual relationship
    c) Inter-personal relationship
    d) Group relationship

41. Self discovery is a fundamental component of
    a) Personal growth
    b) Personal Preferences
    c) Feelings
    d) Values

42. Soft skills are
    a) People Skills
    b) Social and Communication Skills
    c) Emotional Intelligence
    d) Values

43. Technical skills is the part of
    a) Soft skills
    b) Hard Skills
    c) Core Skills
    d) None of the above

44. Values are the
    a) Guiding principles of other
    b) Guiding principles of our behavior
    c) Guiding principles of our thoughts
    d) None of the above

45. Thoughts are
    a) The way you perceived
    b) The way you treat other
    c) The way you think
    d) The way you behave

46. Personality is referred to as set of
    a) Behaviours b) Feelings c) Thoughts d) All the above

47. Self awareness is
    a) The journey to know, identify is explore the world inside
    b) The ability to introspect, analyze and accept one's through action and feelings
    c) Recognizing and acknowledging one's needs and desires
    d) All the above

48. Knowing yourself is the beginning of all
    a) Intelligence b) Knowledge c) Insight d) Wisdom

49. Self-awareness is the first step in having
    a) Control over your past and your future experiences
    b) Control over your present and your future experiences
    c) Control over your present, past and your future experience
    d) None of the above

50. Creative thinking is the ability
    a) To come up with unique, original solutions
    b) To come up with similar solution
    c) To came up with other ideas
    d) None of the above

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CBCS SCHEME

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21MAT31

Third Semester B.E. Degree Examination, Jan./Feb. 2023
Transform Calculus, Fourier Series and Numerical Techniques

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Find the Laplace transform of $te^{2t} - \frac{2\sin 3t}{t}$. **(06 Marks)**

b. Given that $f(t) = \begin{cases} E, & 0 < t < a/2 \\ -E, & a/2 < t < a \end{cases}$

where $f(t+a) = f(t)$ show that $L\{f(t)\} = \frac{E}{S}\tan h\left(\frac{as}{4}\right)$. **(07 Marks)**

c. Using convolution theorem obtain the inverse. Laplace transform of the following function :

$\frac{1}{(s-1)(s^2+1)}$. **(07 Marks)**

OR

2 a. Find the inverse Laplace transform of :

$\frac{s+5}{s^2-6s+13}$. **(06 Marks)**

b. Express the following function interms of unit step function and hence find their Laplace transform.

$$f(t) = \begin{cases} 1, & 0 < t < 1 \\ t, & 1 < t \le 2 \\ t^2 & t > 2. \end{cases}$$ **(07 Marks)**

c. Solve the following intial value problem by using Laplace transform :

$\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 4y = e^{-t}, y(0) = 0, y'(0) = 0$. **(07 Marks)**

Module-2

3 a. Obtain Fourier series of $f(x) = \frac{\pi - x}{2}$ in $0 < x < 2\pi$. Hence deduce that

$1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \text{------} = \frac{\pi}{4}$. **(06 Marks)**

b. Find a cosine Fourier series for $f(x) = (x-1)^2, 0 \le x \le 1$. **(07 Marks)**

c. Obtain the Fourier series of y upto the First harmonic for the following values.

x°	45	90	135	180	225	270	315	360
y	4.0	3.8	2.4	2.0	–1.5	0	2.8	3.4

(07 Marks)

OR

4 a. Obtain Fourier series for

$$f(x)=\begin{cases}\pi x & \text{in } 0\le x\le 1\\ \pi(2-x) & \text{in } 1\le x\le 2\end{cases}.$$ **(06 Marks)**

b. Obtain the sine half range series for the function :

$$f(x)=1-\left(\frac{x}{\pi}\right)\text{in } 0\le x\le\pi.$$ **(07 Marks)**

c. The following values of y and x are given. Find Fourier series of upto first harmonics.

x	0	2	4	6	8	10	12
y	9.0	18.2	24.4	27.8	27.5	22.0	9.0

(07 Marks)

Module-3

5 a. If $f(x)=\begin{cases}1-x^2, & |x|<1\\ 0, & |x|\ge 1\end{cases}$. Find Fourier transform of f(x) and hence find the value of

$$\int_0^\infty \frac{x\cos x-\sin x}{x^3}\,dx.$$ **(06 Marks)**

b. Find the Fourier sine transform of $f(x)=e^{-|x|}$ and hence evaluate

$$\int_0^\infty \frac{x\sin mx}{1+x^2}dx,\ m>0.$$ **(07 Marks)**

c. Solve by using Z-Transforms $U_{n+2}+2U_{n+1}+U_n=n$ with $U_0=0=U_1$. **(07 Marks)**

OR

6 a. Obtain the Fourier cosine transform of the function :

$$f(x)=\begin{cases}4x, & 0<x<1\\ 4-x, & 1<x\le 4\\ 0, & x>4.\end{cases}$$ **(06 Marks)**

b. Obtain the Z-transform of Cos n θ and Sin n θ **(07 Marks)**

c. Compute the inverse Z-transform of $\frac{3z^2+2z}{(5z-1)(5z+2)}$. **(07 Marks)**

Module-4

7 a. Classify the following partial differential equations :

i) $x^2u_{xx}+(1-y^2)u_{yy}=0,\ -\infty<x<\infty,-1<y<1$

ii) $(1+x^2)u_{xx}+(5+2x^2)u_{xt}+(4+x^2)u_{tt}=0$

iii) $(x+1)u_{xx}-2(x+2)u_{xy}+(x+3)u_{yy}=0.$ **(10 Marks)**

b. Solve $u_t=u_{xx}$ subject to the conditions u(0, t) = 0 = u(1, t) and u(x, 0) = sin(πx) by taking h = 0.2 for 5 levels. Further write down the following values from the table

i) u(0.2, 0.04)

ii) u(0.4, 0.08)

iii) u(0.6m 0.06). **(10 Marks)**

OR

8 a. Solve the elliptic equation $u_{xx} + u_{yy} = 0$ for the following square Mesh with boundary values as shown. Find the iterative values of u_i(1 to 9) to the nearest integer.

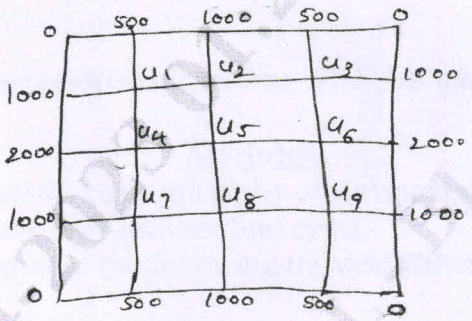

Fig.Q8(a) **(10 Marks)**

b. Solve $25u_{xx} = u_{tt}$ at the pivotal points given $u(0, t) = 0 = u(5, t)$, $u_t(x, 0) = 0$ and $u(x,0) = \begin{cases} 20x, & 0 \le x \le 1 \\ 5(5-x), & 1 \le x \le 5 \end{cases}$ by taking h = 1 compute u(x, t) for $0 \le t \le 1$. **(10 Marks)**

Module-5

9 a. Given $y'' - xy' - y = 0$ with the initial conditions $y(0) = 1$, $y'(0) = 0$ compute y(0.2) using fourth order Runge – Kutta method. **(06 Marks)**

b. Derive the Euler's equation. **(07 Marks)**

c. Find the extremal of the functional. **(07 Marks)**

$$\int_{x_1}^{x_2} (y^2 + y'^2 + 2ye^x)dx .$$

OR

10 a. Obtain the solution of the equation $2\frac{d^2y}{dx^2} = 4x + \frac{dy}{dx}$ by computing the value of y(1.4) by applying Milne's method using following data :

x	1	1.1	1.2	1.3
y	2	2.2156	2.4649	2.7514
y'	2	2.3178	2.6725	3.0657

(06 Marks)

b. Find the curve on which the functional $\int_0^1 [[y']^2 + 12xy]dx$ with $y(0) = 0$ and $y(1) = 1$ can be determined. **(07 Marks)**

c. Prove that the shortest distance between two points in a plane is straight line. **(07 Marks)**

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