Jharkhand University of Technology, Ranchi

Diploma 1st Semester Examination, 2024 (NEP-2024)

Subject : Basic Surveying **Subject Code : CIV-101**

Time Allowed : 3 Hours **Full Marks : 70**

Pass Marks : 21

Answer in your own words.
Answer five *questions in which* Question No. 1 *is compulsory.*
All questions carry equal marks.

1. Choose the correct alternative of the following: 14

(i) The chain having length of 100 feet divided into 100 links is known as _____.
(a) Metric chain (b) Engineer's chain
(c) Revenue chain (d) All of these

(ii) The line on which framework of the survey work is built is known as _____.
(a) base line (b) main line
(c) control line (d) None of these

(iii) The chain having length of 100 feet divided into 100 links is known as _____.
(a) Metric chain (b) Engineer's chain
(c) Revenue chain (d) All of these

(iv) Which instrument/s is/are available for taking offsets?
(a) Optical square (b) Indian optical square
(c) Open cross staff (d) All of these

(v) Which of the following is/are type/s of bearing?
(a) Magnetic bearing (b) Whole circle bearing
(c) Reduced bearing (d) All of these

(vi) What is the equivalent value in RB of 315° ?
(a) 315° (b) N 45° W
(c) N 85° W (d) None of these

2. (a) Prepare a list of accessories required for a chain survey. Explain the functions of each.
(b) Explain in detail about the various errors that occurs during chaining. 7+7

3. (a) List out the various objectives of surveying.

(b) Describe about direct and indirect ranging with a neat sketch. 7+7

4. (a) A surveyor measured the distance between two points on the plan drawn to a scale of 1cm = 40m and the result was 468 m. Later he discovered that he used a scale of 1 cm = 20 m. Find the true distance between these two points.

(b) What are the different tape corrections and how they are applied? 7+7

5. (a) What is meant by traverse? Discuss about the errors in compass survey.

(b) The following bearings were observed while traversing with a compass. Mention which stations were affected by local attraction and determine the corrected bearings. 7+7

LINE	F.B	B.B
AB	45° 45'	226°10'
BC	96°55'	277° 5'
CD	29°45'	209°10'
DE	324° 48'	144° 48'

6. (a) Describe briefly about Prismatic Compass. Discuss in detail about the adjustments of Surveyor's compass.

(b) The following bearings were observed with a compass. Calculate the interior angles. 7+7

LINE	FORE BEARING
AB	60° 30'
BC	122°0'
CD	46° 0'
DE	205° 30'
EA	300°0'

7. Write short notes on the following (*any four*): 3.5×4=14

(a) Magnetic meridian, true meridian

(b) Dip and declination

(c) Whole circle bearing and reduced bearing

(d) Closed traverse and open traverse

(e) Fore sight and back sight

Jharkhand University of Technology, Ranchi

Diploma 1st Semester Examination, 2024 (NEP-2024)

Subject : Communication Skills **Subject Code : BSC104**

Time Allowed : 3 Hours **Full Marks : 70**

Pass Marks : 21

Answer in your own words.
Answer any five *questions in which* Question No. 1 *is compulsory.*
The figures in the margin indicate full marks.
All questions carry equal marks.

2×7=14

1. Choose the correct option / answer the following:

(i) How many vowels are there in the English alphabet?
(a) 4 (b) 5
(c) 9 (d) 7

(ii) List out the consonants in the word: Education
(a) d, c, u, n (b) d, c, t, n
(c) d, c, t (d) c, t, n, u

(iii) What is the correct plural form of 'child'?
(a) Childs (b) Childes
(c) Children (d) Childrens

(iv) Choose the correct conjunction: "I like both tea _____ coffee."
(a) but (b) or
(c) and (d) because

(v) What type of sentence is this? "Anna, answer the door"?
(a) Declarative (b) Imperative
(c) Interrogative (d) Exclamatory

(vi) Which sentence is in the passive voice?
(a) The cat chased the mouse. (b) The mouse was chased by the cat.
(c) Chasing the mouse, the cat ran. (d) Mouse is chased by cat.

(vii) Communication saves time in
(a) internal communication. (b) interview.
(c) oral communication. (d) schedule.

2. (a) Define Communication. Discuss various characteristics of successful communication.

   (b) Define Noise. Discuss different types of barriers to communication. 7+7

3. (a) Define Verbal communication. Explain the advantages and disadvantages of written communication.

   (b) What is effective listening? Differentiate between effective and ineffective listening. 7+7

4. (a) What are Non-verbal aspects of communicating? Distinguish between verbal and non-verbal communication.

   (b) What do you mean by Resume? Draft the format of resume. 7+7

5. (a) Read the passage carefully and answer the questions:

   The art of academic writing is not easy to master. It is a formal skill, which requires precision and accuracy and is perfected by continuous and dedicated practice. Academic writing is the skilful exposition and explanation of an argument, which the writer has carefully researched and developed over a sustained period of time. It is a time-consuming activity and demands patience and perseverance. But the joy of reading and sharing with others, one's succinctly composed piece of argument, is incomparable. Before beginning to write, the writer must ask himself a few questions. — Why am I writing? What is it that I intend to share with others? What purpose will my writing serve? Have I read enough about the topic or theme about which I am going to write? If one is hesitant to answer even one of the aforementioned questions, one better not write at all! Because academic writing is a serious activity— it makes one part of a shared community of readers and writers who wish to disseminate and learn from well-argued pieces of writing. The structure of an argumentative essay should take the form of — Introduction (which should be around ten percent of the entire essay), Body (it should constitute eighty percent of the piece) and the Conclusion (again, ten percent of the essay). The introduction should function as the hook which draws the reader in and holds his attention, the body should include cogent and coherently linked paragraphs and the conclusion should re-state the argument and offer a substantial ending to the piece.

   Questions:

   (i) What is academic writing?

   (ii) Why is reading an important part of writing?

   (iii) Why should one ask oneself the questions mentioned in the second passage?

   (iv) What are the components of the structure of an argumentative essay?

   (b) What are different types of reading skills and strategies? 7+7

6. (a) What are the features of fax and email that make them effective tools of speedy communication?

   (b) What are the essential elements of a presentation? 7+7

7. Write short notes on *any four* of the following:

(a) Physical barrier

(b) Feedback

(c) Scanning reading skill

(d) Online meeting

(e) Interpersonal communication

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ALL

Jharkhand University of Technology, Ranchi

Diploma 1st Semester Examination, 2024 (NEP-2024)

Subject : Engineering Chemistry | **Subject Code : BSC103**

Time Allowed : 3 Hours | **Full Marks : 70**

Pass Marks : 21

Answer in your own words.
Answer five *questions in which* Question No. 1 *is compulsory.*
The figures in the margin indicate full marks.
All questions carry equal marks.

1. Choose the correct option: 2×7=14

(i) The electronic configuration of Cu^{2+} ion is

(a) $[Ar]\ 4s^1\ 3d^8$ (b) $[Ar]\ 4s^2\ 3d^{10}\ 4p^1$

(c) $[Ar]\ 4s^1\ 3d^{10}$ (d) $[Ar]\ 3d^9$

(ii) Bohr proposed that while revolving in discrete orbits, the electrons

(a) gain energy (b) lose energy

(c) do not radiate energy (d) first lose energy and then gain energy

(iii) What is the most difficult atom to ionize?

(a) Hydrogen (b) Helium

(c) Beryllium (d) Neon

(iv) Which of the following is a synthetic polymer commonly used in making plastic?

(a) Cellulose (b) Starch

(c) Protein (d) Polyethylene

(v) Which of the following is not a type of electrochemical cell?

(a) Voltaic cell (b) Photovoltaic cell

(c) Electrolytic cell (d) Fuel Cell

(vi) Which industry causes all three: air, water and land pollution?

(a) Fertilizer and pesticides (b) Oil refineries and iron, steel

(c) Oil refineries and caustic soda (d) Iron, steel and caustic soda

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(vii) Which of the following metal is utilized in trucks, automobile engines, aircraft and missiles?

(a) Stainless steel
(b) Carbon steels
(c) Magnesium
(d) Cast irons

2. (a) Write about the different types of valency with suitable examples.
(b) Define orbitals. Explain Aufbau Principle for filling up of the orbitals. 7+7

3. (a) Explain Arrhenius Theory of Ionization.
(b) What is degree of Ionization? Discuss the factors affecting degree of ionization. 7+7

4. (a) What are different types of alloys? Describe the purpose of making alloys.
(b) Explain the physical properties & applications of Cu and Al. 7+7

5. (a) Define polymers. Compare natural and synthetic rubber with suitable examples.
(b) Write about the engineering applications of plastic based on their properties. 7+7

6. (a) What do you mean by E-waste? Write about different types of waste.
(b) Describe air pollution and explain causes and remedial measure of air pollution. 7+7

7. Write short notes on *any four* of the following: 3.5×4=14
(a) Water Pollution
(b) Electrolysis
(c) Gun Metal
(d) Thermal Insulators
(e) BOD and COD

Jharkhand University of Technology, Ranchi

Diploma 1st Semester Examination, 2024 (NEP-2024)

Subject : Engineering Mathematics **Subject Code : BSC 101**

Time Allowed : 3 Hours **Full Marks : 70**

Answer in your own words.

Answer any five *questions.* Question No. 1 *is compulsory.*

Marks are given in the right margin.

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1. Choose the correct answer in the following: 2×7=14

(i) If A is a 2×2 matrix such that $|A| = 5$ and $|A| \neq 0$ then the value of $|4A|$ is

(a) 20 (b) 25

(c) 80 (d) None of these

(ii) If A and B are invertible square matrices of the same order then $(AB)^{-1} = ?$

(a) AB^{-1} (b) $A^{-1}B^{-1}$

(c) $B^{-1}A$ (d) $B^{-1}A^{-1}$

(iii) Find the slope of a line whose inclination is 60°.

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$

(c) 1 (d) None of these

(iv) The equation of the line that makes intercepts at 2 and –3 on the x-axis and y-axis respectively is represented as

(a) $2x - 3y = 6$ (b) $x - 2y = 3$

(c) $3x - 2y = 6$ (d) None of these

(v) If $\sin x = \frac{1}{6}$ then $\sin 3x$ can be expressed as

(a) $\frac{1}{2}$ (b) $\frac{13}{27}$

(c) $\frac{12}{27}$ (d) None of these

(vi) The first order derivative of $\log_3 x$ is

(a) $\log 3$ (b) $\frac{1}{x}$

(c) $\frac{1}{x(\log 3)}$ (d) None of these

(vii) Find the value of the integral $\int \frac{\sin 2x}{\sin x}\, dx$.

(a) $2\sin x + c$ (b) $2\cos x + c$

(c) $\frac{1}{2}\sin x + c$ (d) $\frac{1}{2}\cos x + c$

2. (a) Prove that $\begin{vmatrix} 1 & b+c & b^2+c^2 \\ 1 & c+a & c^2+a^2 \\ 1 & a+b & a^2+b^2 \end{vmatrix} = (a-b)(b-c)(c-a)$.

(b) Solve the system of equations $x + y + z = 6; 2x + 3y - z = 5; 6x - 2y - 3z = -7$ using Cramer's rule. 7+7

3. (a) Find the equation of the line passing through the point (–2, –4) and perpendicular to the line $3x - y + 5 = 0$.

(b) Reduce the equation $\sqrt{3}x + y + 2 = 0$ to intercept form and find the intercepts on the axes. 7+7

4. (a) Find the values of all trigonometric functions of $120°$.

(b) Prove that: $\cos\alpha + \cos\beta + \cos\gamma + \cos(\alpha+\beta+\gamma) = 4\cos\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\beta+\gamma}{2}\right)\cos\left(\frac{\gamma+\delta}{2}\right)$. 7+7

5. (a) Find the second order derivative of $e^{2x}\cos 3x + x^4$.

(b) Obtain the local maxima or local minima of $f(x) = x^3 - 6x^2 + 9x + 15$. Also find the local maximum or local minimum values of $f(x)$. 7+7

6. (a) Evaluate: $\int_{-a}^{a} \sqrt{\frac{a-x}{a+x}}\, dx$.

(b) Calculate the area bounded by the parabola $y^2 = 4ax$ and its latus rectum. 7+7

7. Write short notes on *any four*: 3.5×4=14

(a) Inverse of a matrix

(b) Collinear points

(c) ASTC diagram

(d) Stationary points

(e) Integration by parts

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ALL

Jharkhand University of Technology, Ranchi

Diploma 1st Semester Examination, 2024 (NEP-2024)

Subject : Engineering Physics **Subject Code : BSC 102**

Time Allowed : 3 Hours **Full Marks : 70**

Answer in your own words.
Answer any five *questions.* Question No. 1 *is compulsory.*
Marks are given in the right margin.

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1. Choose the correct answer in the following: 2×7=14

(i) The dimensional formulae for Speed is
(a) $[M^0L^0T^0]$ (b) $[M^0L^1T^{-1}]$
(c) $[M^1L^1T^1]$ (d) None of these

(ii) Stoke's formula is related with
(a) Initial velocity (b) Final velocity
(c) Terminal velocity (d) Critical velocity

(iii) Isobaric process is
(a) No communication of heat (b) Pressure constant
(c) Volume constant (d) Temperature constant

(iv) Laser is
(a) Bichromatic (b) Monochromatic
(c) Polychromatic (d) None of these

(v) Unit of stress is
(a) Newton (b) Joule
(c) N/m^2 (d) None of these

(vi) S.I. unit of temperature is _____
(a) Celsius (b) Kelvin
(c) Newton (d) None of these

(vii) The physical property of a material that can not returns to its original shape after the stress is removed is known as
(a) Plasticity (b) Elasticity
(c) Opacity (d) None of these

2. (a) Define unit. Also explain fundamental unit and derived unit with examples.
   (b) Briefly discuss Vernier calliper with schematic diagram. 7+7

3. (a) Explain Young's modulus of elasticity, Bulk modulus of elasticity and Modulus of rigidity.
   (b) Explain Newton's law of viscosity. 7+7

4. (a) Briefly explain the modes of heat transfer.
   (b) What are Centigrade scale, Fahrenhiet scale and Kelvin scale? 7+7

5. (a) What do you mean by reflection and refraction of light? Explain.
   (b) Derive the relation among velocity, frequency and wavelength. 7+7

6. (a) Explain construction and working of photoelectric cell.
   (b) Calculate the energy of photon of red light in a vacuum with a wavelength of 695nm. 7+7

7. Write short notes on *any four*: 3.5×4=14
   (a) Reynold's number
   (b) Capillary action
   (c) Properties of laser
   (d) X-rays
   (e) Boyle's law