

Registration Number

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INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY

Bargarh/Fulia/Guwahati/Jodhpur/Salem/Varanasi/Champa/Kannur/KHTI-Gadag/SPKM-Venkatagiri/KLB-IIHT-Hyderabad

Diploma in Handloom & Textile Technology

NOV/DEC-2025 SEMESTER EXAMINATION

(Regulation-2021)

Semester : II

Time:3 Hours

Course Code & Title : BS102 Mathematics - II

Maximum Marks: 100

PART-A

(10×2=20 Marks)

Answer all the questions within two to three sentences

1. If $\begin{bmatrix} 2x & y \\ 1 & 3 \end{bmatrix} + \begin{bmatrix} 4 & 2 \\ 0 & -1 \end{bmatrix} = \begin{bmatrix} 8 & 3 \\ 1 & 2 \end{bmatrix}$ find x and y .
2. Find the inverse of the matrix $\begin{bmatrix} 7 & 4 \\ -3 & 2 \end{bmatrix}$
3. Evaluate: $\int \cos 10x \, dx$
4. Evaluate: $\int e^{-2x} \, dx$
5. Find the equation of the parabola whose vertex is at the origin and focus at (0,2).
6. Find the Centre and radius of the circle $x^2 + (y + 2)^2 = 4$
7. Find the magnitude of the vectors $\vec{a} = 3\hat{i} - 2\hat{j} + 6\hat{k}$ and $\vec{b} = 2\hat{i} - 2\hat{j} + 3\hat{k}$
8. Write conditions for perpendicular vectors and parallel vectors
9. Define two types of error in testing hypothesis.
10. Write any two uses of t-test.

PART-B

((6+10)×5=80 Marks)

Answer all the questions in detail

11. A. If $A = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -1 \\ 4 & 2 \end{bmatrix}$ then verify that $(A + B)^T = A^T + B^T$ (6)
B. Solve the following equations using Cramer's rule (10)
 $x + 2y + 3z = 6$, $2x + 4y + z = 7$, $3x + 2y + 9z = 14$
(OR)
C. Show that $\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ y+z & z+x & x+y \end{vmatrix} = 0$ (6)
D. Find the inverse of matrix $\begin{bmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -4 & 2 \end{bmatrix}$ (10)
12. A. Evaluate: $\int (x^2 + \frac{2}{x} - \frac{4}{x^4} + e^{-x}) \, dx$ (6)
B. Evaluate: $\int x^2 e^x \, dx$ using integration by Parts method (10)
(OR)

- C. Evaluate: (i). $\int_0^{\pi/2} \cos^9 x \, dx$ (6)
- D. Evaluate: $\int \frac{x+2}{x^2+4x-3} \, dx$ (10)
13. A. Find the value of 'x' if A $(0, -\frac{3}{2})$, B(x,-1) and C $(2, -\frac{1}{2})$ are collinear (6)
- B. Find the eccentricity, Centre, foci and vertices of ellipse $\frac{x^2}{64} + \frac{y^2}{25} = 1$ (10)
- (OR)**
- C. Find the equation of circle for which (3,4) and (2,-7) are the ends of it's diameter. (6)
- D. Find the equation of straight line passing through the point (1,-1) and parallel to $x + 3y - 4 = 0$ (10)
14. A. A force $2\hat{i} + \hat{j} + \hat{k}$ acting on the particle, if the particle is displaced from $4\hat{i} + \hat{j} - 3\hat{k}$ to $5\hat{i} + 4\hat{j} + 2\hat{k}$. Find the work done by the force. (6)
- B. If $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$, $\vec{b} = 2\hat{i} + \hat{j} - 2\hat{k}$, find $\vec{a} + \vec{b}$, $\vec{b} - \vec{a}$, $2\vec{a} + 3\vec{b}$, $3\vec{a} - 2\vec{b}$ (10)
- (OR)**
- C. Find the angle between the vectors $\hat{i} - 2\hat{j} + 3\hat{k}$, and $3\hat{i} - 3\hat{j} + \hat{k}$. (6)
- D. If $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$, $\vec{b} = 2\hat{i} + \hat{j} - 2\hat{k}$ and $\vec{c} = 3\hat{i} + 2\hat{j} + \hat{k}$. Find the following (10)
- (i). $\vec{a} \cdot \vec{b}$, (ii). $(\vec{a} \times \vec{b}) \times \vec{c}$, (iii). $\vec{a} \times (\vec{b} \times \vec{c})$, (iv). $(\vec{a} \times \vec{b}) \cdot \vec{c}$
15. A. The average life time of sample of 100 electric bulbs produced by a company is 1570 hours with standard deviation of 120 hours. If μ is the mean life time of all bulbs produced by the company. Test the hypothesis for $\mu = 1600$ hours at $\alpha = 0.05$ (6)
- B. A die is tossed and the following distribution of faces was observed: (10)
- | | | | | | | |
|-----------|----|----|----|----|----|----|
| Face | 1 | 2 | 3 | 4 | 5 | 6 |
| Frequency | 10 | 22 | 12 | 15 | 22 | 30 |
- Can we say that the die is biased?
- (OR)**
- C. A teacher claims that the average test score in their class is 50. A random sample of 10 students has a mean score of 51.8 and a standard deviation of 1.9. Test the teacher's claim at the 5% significance level. (6)
- D. Two random samples of sizes 8 and 7 had the following values of the variables (10)
- | | | | | | | | | |
|------------|----|----|----|----|----|---|----|----|
| Sample I : | 9 | 11 | 13 | 11 | 15 | 9 | 12 | 14 |
| Sample II: | 10 | 12 | 10 | 14 | 9 | 8 | 10 | |
- Do the estimates of population variance differ significantly?

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Diploma in Handloom & Textile Technology

NOV/DEC-2025 SEMESTER EXAMINATION

(Regulation-2021)

Semester : II

Time:3 Hours

Course Code & Title : **BS103 Applied Physics**

Maximum Marks: 100

PART-A

(10×2=20 Marks)

Answer all the questions within two to three sentences

1. What are the fundamental quantities? Give an example
2. Define least count.
3. List out the different types of moduli of elasticity.
4. Define moment of Inertia.
5. Convert 35°C to Fahrenheit.
6. Define coefficient of thermal conductivity
7. Define wavelength.
8. What are the conditions to achieve total internal reflection?
9. State Ohm's law.
10. What are extrinsic semiconductors? Give an example

PART-B

((6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Find the dimension formula for (i) Force (ii) Pressure and (iii) Area (6)
B. Check the dimensional analysis whether the given equation is correct or not: $E = mgh + \frac{1}{2}mv^2$, where E is the energy, m is the mass, g is the acceleration due to gravity, h is the height & v is the velocity. (10)
- (OR)
- C. What are the different types of measurements? (6)
D. Discuss the different types of errors in measurement with suitable examples (10)
12. A. Define the terms (a) coefficient of viscosity (b) terminal velocity and write the Stoke's formula (6)
B. With a neat graph explain the stress-strain curve. (10)

(OR)

C. Find the moment of inertia of a solid sphere of mass 15 kg and radius 7 meter rotating about an axis passing through its Centre and perpendicular. (6)

D. Define Friction. Explain different types of Friction in details. (10)

13. A. What are the different scales of temperature? Give their relationship (6)

B. Explain the different modes of heat transfer with diagram. (10)

(OR)

C. Write a note on engineering applications of heat (6)

D. Derive the expression for coefficient of linear, surface and volume expansion of solids. (10)

14. A. What are longitudinal and transverse waves? (6)

B. With a neat diagram explain free, damped and forced vibrations? Give examples for each (10)

(OR)

C. State the laws of reflection and refraction. (6)

D. List out the characteristics of Laser and explain (a) Stimulated absorption (b) Spontaneous emission and (c) Stimulated emission. (10)

15. A. Derive the equation for Kirchoff's current law. (6)

B. Derive the equation for the equivalent capacitance for the capacitors connected in series and parallel (10)

(OR)

C. Discuss about intrinsic semiconductors with suitable examples (6)

D. Explain the working of P-N-P transistor with neat diagram (10)

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NOV/DEC-2025 SEMESTER EXAMINATION

(Regulation-2021)

Semester : II

Time:3 Hours

Course Code & Title : **ES102 Introduction to IT Systems**

Maximum Marks: 100

PART-A

(10×2=20 Marks)

Answer all the questions within two to three sentences

1. What is Website? Give any two examples.
2. What is portal? List some of the e-governance portal Websites.
3. What is software? How it differs from hardware.
4. Define OS. Write four examples of OS.
5. What are Container and Empty elements in HTML?
6. What is image tag in HTML?
7. How do you insert a table in MS-Word?
8. What is the use of animation in power point
9. Define keywords in C Language. Give an example.
10. What is a Compiler?

PART-B

((6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Discuss the characteristics of a computer. (6)
B. Explain in detail about the various types of computer with its advantages and disadvantages. (10)
- (OR)
- C. Describe peripheral devices with examples. (6)
D. Explain memory and its types. Compare and contrast HDD (Hard Disk Drive) and SSD (Solid State Drive). (10)
12. A. What is Windows? Write the features of Windows Operating system. (6)
B. What is Operating System? Discuss the types and functions of Operating System. (10)

(OR)

- C. Explain UNIX shell and its types. (6)
- D. What are UNIX commands? Write the commands name with purpose used in UNIX operating system? (10)

- 13. A. What is HTML? Explain the features & versions of HTML. (6)
- B. What is CSS? Why CSS is used in HTML document? Explain the ways to add or insert CSS in HTML document. (10)

(OR)

- C. What is table tag? Discuss the attributes used with <table> tag in HTML. (6)
- D. Explain form tag with its elements. Design a form using different HTML tags. (10)

- 14. A. What is Microsoft word? How MS Word is different from MS Excel? (6)
- B. Design and prepare a Resume using MS-Word. (10)

(OR)

- C. What is Spreadsheet? Mention the applications of MS Excel? (6)
- D. What is Power point presentation? Discuss about MS-Office. (10)

- 15. A. What is C language? How high level language is different from low level language. (6)
- B. Explain Various operators available in C language with examples. Write a C program to find the sum of two numbers. (10)

(OR)

- C. Describe the structure of C language with examples. Write a C Program to find the largest of two numbers. (6)
- D. What are the conditional statements used in C language? Explain with example program. (10)

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Semester : II

Time:3 Hours

Course Code & Title : **ES104 Fundamentals of Electrical,
Electronics Engineering**

Maximum Marks: 100

PART-A

(10×2=20 Marks)

Answer all the questions within two to three sentences

1. Define Passive components with suitable examples.
2. Draw the symbol of NAND and NOR gate.
3. Define CMRR.
4. Draw the symbol of OP-AMP.
5. State Lenz's law
6. Draw the Hysteresis loop
7. Define the Power triangle.
8. Draw the phasor diagram of RL circuit.
9. Define Transformation ratio.
10. Classify the motors.

PART-B

((6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Write a short note about Field Effect Transistor. (6)
B. Explain in detail about PN junction diode with suitable diagram. (10)
- (OR)
- C. Draw the symbols of all Logical Gates with Truth Table. (6)
D. Discuss in detail about Ripple Up Counter. (10)
12. A. Draw and explain the block diagram of the OP-AMP. (6)
B. What is OP-AMP? Write the characteristics of ideal OP-AMP. (10)

(OR)

- C. Compare Differentiator and Integrator. (6)
- D. Draw the circuit diagram and explain the Inverting and Non inverting operation of amplifier. Also, derive the expression for the output voltage. (10)
13. A. Define i) Permeability ii) EMF iii) Leakage Factor. (6)
- B. Compare Magnetic and Electric Circuits. (10)
- (OR)**
- C. Give Short notes about Self and Mutual Induction with suitable expressions. (6)
- D. With a neat diagram, Briefly explain about B-H Curve. (10)
14. A. Describe a cycle, time period, and frequency. (6)
- B. Give the phasor representation of the R-C series circuit and derive the power and power factor expression. (10)
- (OR)**
- C. Define i) Power factor ii) RMS value iii) Average Value. (6)
- D. Derive Voltage and Current relationship in Star and Delta connection with suitable diagram. (10)
15. A. Explain briefly about Auto Transformer (6)
- B. Explain in detail about construction and working principle of single phase Transformer and Derive the EMF equation. (10)
- (OR)**
- C. Explain the working of 3-phase induction motors. (6)
- D. Explain how DC motors work and their types in detail. (10)

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NOV/DEC-2025 SEMESTER EXAMINATION

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Semester : II

Time:3 Hours

Course Code & Title : **ES106 Engineering Mechanics**

Maximum Marks: 100

PART-A

(10×2=20 Marks)

Answer all the questions within two to three sentences

1. Differentiate the rigid body and the flexible body.
2. State the parallelogram law of forces.
3. State the conditions for the static equilibrium of planar member acted upon by two forces.
4. Classify the different types of flexural loads on the beam.
5. Define the term 'angle of friction'.
6. State any four applications of friction.
7. What are two dimensional geometries? Give any two examples.
8. Define the term 'composite geometry'.
9. Differentiate the load and the effort.
10. Draw the worm and worm wheel arrangement.

PART-B

((6+10)×5=80 Marks)

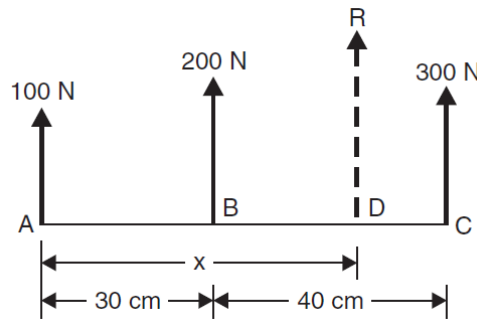
Answer all the questions in detail

11. A. Brief the characteristics and the effects of a force with example. (6)
B. Determine analytically the magnitude and direction of the resultant of the (10)
following four forces acting at a point:
(i) 10 N pull North to East at an angle of 30°;
(ii) 12.5 N push South to West at an angle of 45°;
(iii) 5 N push North to West an angle of 60°;
(iv) 15 N push South to East at angle of 60°.

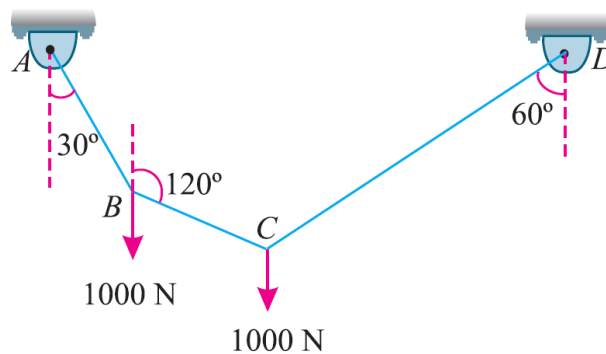
(OR)

- C. State and explain the law of triangle as applicable for concurrent and co-planar (6)
force systems.
D. Three like parallel forces 100 N, 200 N and 300 N are acting at points A, B and (10)
C respectively on a straight line ABC as shown in Fig. The distances are AB =

30 cm and $BC = 40$ cm. Find the resultant and also the distance of the resultant from point A on line ABC.

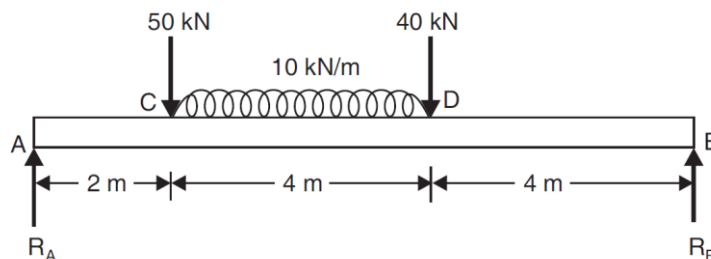


12. A. Enumerate the steps in analyzing the equilibrium of multiple forcing systems using Free body diagram approach with example. (6)
- B. A string ABCD, attached to fixed points A and D has two equal weights of 1000 N attached to it at B and C. The weights rest with the portions AB and CD inclined at angles as shown in Fig. (10)



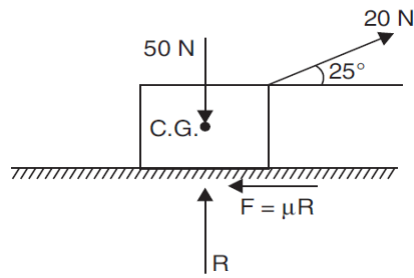
(OR)

- C. Differentiate the simply supported beam with and without overhang with an example. (6)
- D. A simply supported beam of length 10 m, carries the uniformly distributed load and two point loads as shown in Fig. Calculate the reactions R_A and R_B . (10)



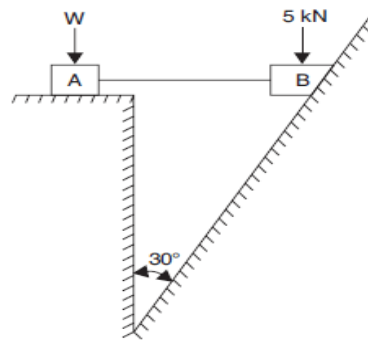
13. A. State the Laws of solid friction. (6)
- B. The force required to pull the body of weight 50 N on a rough horizontal surface is 20 N when it is applied at an angle of 25° with the horizontal as shown in Fig. Determine the co-efficient of friction and magnitude of reaction R between (10)

the body and the horizontal surface. Does the reaction pass through the C.G. of the body?

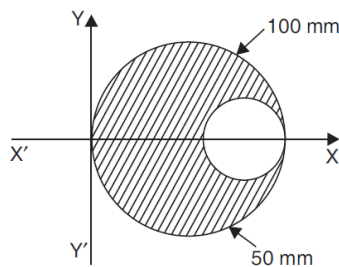


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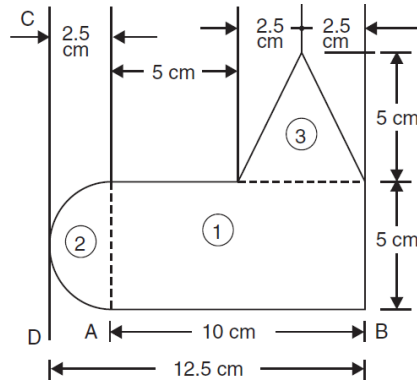
- C. What do you mean by ‘angle of repose’? explain the relationship between the angle of repose and the angle of friction with example. (6)
- D. Two blocks which are connected by a horizontal link AB are supported on two rough planes as shown in Fig. The co-efficient of friction of block A is 0.4. The angle of friction for the block B on the inclined plane is $\phi = 20^\circ$. Find the smallest weight W of the block A for which equilibrium can exist. (10)



14. A. From a circular plate of diameter 100 mm a circular part of diameter 50 mm is cut as shown in Fig. Find the centroid of the remainder. (6)



- B. Using the analytical method, determine the centre of gravity of the plane uniform lamina shown in Fig. (10)

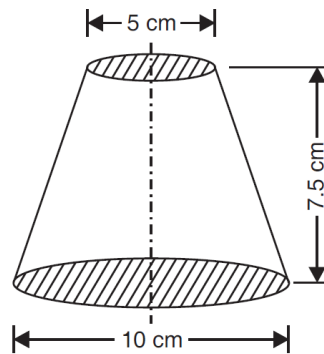


(OR)

C. Draw the sketch of the following solids and specify their centre of gravity. (6)

- (i) Cylinder,
- (ii) Sphere,
- (iii) Right circular cone

D. The frustrum of a solid cone has base diameter 10 cm, the top diameter 5 cm (10) and height 7.5 cm. Determine the centre of gravity of the solid.



15. A. State the advantages and applications of simple lifting machine. (6)

B. The law of a certain lifting machine is $P = 1.5 + 0.02W$. The velocity ratio of the machine is 100. Find the maximum possible mechanical advantage and maximum possible efficiency of the machine. Determine the effort required to overcome friction while lifting a load of 150 N. Also calculate the efficiency at this load. (10)

(OR)

C. What are reversible and non-reversible machines? Explain. (6)

D. A screw jack has square threads 50 mm mean diameter and 10 mm pitch. The load on the jack revolves with the screw. The coefficient of friction at the screw thread is 0.05. Find the tangential force required at the end of 300 mm lever to lift a load of 6000 N. State whether the jack is self-locking. If not, find the torque which must be applied to keep the load from descending. (10)
