Registration Number | | | | | | | |

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

April/ May - 2026 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. Find determinant of A. If $A=\begin{bmatrix}3 & 1 & 2\\ 2 & -3 & -1\\ 1 & 2 & 1\end{bmatrix}$.
2. If $A=\begin{bmatrix}1 & 2\\ 3 & 2\end{bmatrix}$ and $B=\begin{bmatrix}0 & 1\\ -1 & 0\end{bmatrix}$, find 2A−B.
3. Solve $\int x^{-4}dx$.
4. Solve $\int_0^{\pi/2}\sin^3 x\,dx$.
5. Find the equation of a circle with center (2, −3) and radius 5.
6. What is the condition for two lines to be perpendicular?
7. Define scalar product.
8. If $\vec{a}=5\vec{i}+3\vec{j}+6\vec{k}$ and $\vec{b}=2\vec{i}-\vec{j}-2\vec{k}$. Find $4\vec{a}-2\vec{b}$.
9. Define Type – I error and Type – II errors.
10. State the condition for applying χ^2 test.

PART-B **(**(6+10) ×5=80 Marks)

Answer all the questions in detail

11. A. Find the inverse of $A=\begin{bmatrix}1 & 2\\ 3 & 7\end{bmatrix}$. (6)

    B. Solve the system of equations using matrix inversion (10)
    $2x-y+3z=9,\ x+y+z=6,\ x-y+z=2.$

    (OR)

    C. Examine the consistency of the system $x+y+z=3,\ 2x-y+z=2,\ 3x+2y-2z=3.$ (6)

    D. Solve the following using Cramer's Rule (10)
    $x+2y+3z=6,\ 2x+4y+z=7,\ 3x+2y+9z=14$

12. A. Solve $\int\frac{\log x}{x}\,dx$. (6)

    B. Evaluate $\int_0^{\pi/2}\frac{\sin x}{\sin x+\cos x}dx$. (10)

(OR)

C. Evaluate $\int_0^1 (4+3x^2)\,dx$. (6)

D. Solve $\int \frac{1}{(x+1)(x+2)}\,dx$ by using partial fraction method. (10)

13. A. Find the equation of a straight line passing through the point (4, -5) and which is perpendicular to the line $3x+4y+5=0$. (6)

B. Find the equation of the circle passing through the points (1,1), (2, −1), and (3,2) (10)

(OR)

C. Find the coordinates of the center and the length of the radius for the circle equation $x^2+y^2-8x+10y-12=0.$ (6)

D. Find the equation of a straight line passing through (2,3) and the intersection of the lines $x+y=5\ and\ 2x-y=1.$ (10)

14. A. Find the unit vector in the direction of $\vec{A}=\vec{i}+2\vec{j}+2\vec{k}.$ (6)

B. Find the vector product of $\vec{A}=2\vec{i}+3\vec{j}+2\vec{k}$ & $\vec{B}=\vec{i}+5\vec{j}+6\vec{k}.$ (10)

(OR)

C. Find the magnitude of the vector $\vec{A}=3\vec{i}+4\vec{j}+12\vec{k}.$ (6)

D. Find the work done by a force $\vec{F}=2\vec{i}+2\vec{j}+\vec{k}$ acting on the particle, if the particle is displacement from $o\vec{i}+4\vec{j}+3\vec{k}.$ (10)

15. A. Given a sample mean of 83, a sample standard deviation of 12.5 and a sample size of 22, test the hypothesis that the value of the population mean is 70 against the alternative that it is more than 70. Use 0.025 significance level (6)

B. Examine whether the nature of area is related to voting preference in the election for which the data are tabulated below (10)

Group	A	B	Total
Rural	620	480	1100
Urban	380	520	900
Total	1000	1000	2000

(OR)

C. A sample of 900 members has a mean 3.4cm and standard deviation 2.61cm.Is the sample from a large population of mean 3.25cms and standard deviation of 2.61 cms? Test at 5% level of significance. (6)

D. The mean of 2 large samples 1000 and 2000 members are 67.5 and 68.0 inches respectively. Can the samples the regarded as drawn from the same population of S.D 2.5 inches. (10)

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April/ May - 2026 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. Write the dimensional formula for momentum?
2. What is meant by derived physical quantities? Give an example?
3. What is strain? Write down its unit?
4. Define co-efficient of viscosity?
5. What is meant by temperature?
6. Define co-efficient of thermal conductivity?
7. Define longitudinal wave?
8. What is stimulated emission?
9. What is Conductance?
10. What is the Insulator's?

PART-B **(**(6+10) ×5=80 Marks)

Answer all the questions in detail

11. A. Explain Measuring Instruments in detail? (6)

    B. What are the fundamental quantities? Write down all the seven fundamental quantities and their units? (10)

(OR)

    C. Write a note on absolute error and relative error? (6)

    D. Convert 70 joules into ergs using dimensions. (10)

12. A. Draw Hooks law, write down its application. (6)

    B. Draw stress – strain curve and explain the elastic behavior of a material. (10)

(OR)

    C. Explain different types of friction in details. (6)

    D. A wire of length 2 meter is stretched by a force of100N. The area of cross section of the write is 0.008m2 and the increase in length is 0.05mm. calculate the stress, strain and young's modulus (10)

13. A. State and explain three types of heat transfer. (6)

B. State the relation among co-efficient of linear, surface and cubical expansions are solid. (10)

(OR)

C. What are the properties of thermal radiation? (6)

D. At 30℃, the area of a sheet of aluminum is 40cm2 and the co-efficient of linear expansion is 24×10-6 C-1. Determine the final temperature if the final area is 40.2cm2. (10)

14. A. Explain the following terms with an example? (6)
(a) Wavelength (b) frequency (c) velocity (d) amplitude.

B. Explain wave motion and types of waves along with diagrams. (10)

(OR)

C. Explain the phenomenon of total internal reflection. (6)

D. The angle of a glass Prism is 58˚, calculate the angle of minimum deviation is the refractive index of the material of the prism is 1.635. (10)

15. A. Explain PNP and NPN Transistor with diagram? (6)

B. Define an expression for the total resistance when three resistors are connected in series and parallel? (10)

(OR)

C. Calculate the current and resistance of a 100w, 200 V electric bulb (6)

D. Explain N type semi-conductor with diagram (10)

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Semester : **II** Time:3 Hours

Course Code & Title : **ES102 Introduction to IT System.** Maximum Marks: 100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. CPU
2. MS Windows
3. Write the full form of HTML, CSS, CLI, GUI.
4. What is Spreadsheet.
5. Write any four Data types used in C - Language.
6. What is Portal? List some of the e-governance Portal websites.
7. Define Kernel in operating system.
8. What are attributes in HTML.
9. Write any two features of Microsoft PowerPoint.
10. Who is the father of C- Programming Language and in which year it was developed.

PART-B **(**(6+10) ×5=80 Marks)

Answer all the questions in detail

11. A. Define Computer? Explain the characteristics of a computer? (6)

    B. What are Peripheral devices? Explain the types of peripheral devices with examples? (10)

(OR)

    C. Define web browser? How web browser is different from search Engine? (6)

    D. Define Memory? Explain the types of memory used in a computer with examples? How primary memory is different from secondary memory? (10)

12. A. Define UNIX OS? How UNIX is different from LINUX. (6)

    B. Define OS? Explain the types and functions of Operating System. (10)

(OR)

C. Define UNIX Shell? Explain its types? (6)

D. What are UNIX Commands? Write any eight UNIX Commands with description. (10)

13. A. What is HTML? Explain the features of HTML? (6)

B. What is CSS? Why CSS is used in HTML Document? Explain the ways to add CSS in HTML document. (10)

(OR)

C. Explain the structure of the HTML Webpage with an example? (6)

D. Define Heading Tag? Briefly explain the building blocks of HTML? (10)

14. A. How open office is different from MS Office. (6)

B. What is Microsoft Word? Design and prepare a Resume using MS-Word. (10)

(OR)

C. Define MS Excel? Mention the applications of MS Excel. (6)

D. Describe and discuss the MS Office Suite. (10)

15. A. Explain various data types used in C- Programming Language with examples. (6)

B. What is a C – Program? Write a Program in C language to check whether a given number is even or odd. (10)

(OR)

C. Define High Level Language? Write a program in C Language to find sum of two numbers. (6)

D. Describe Conditional Statements in C Language. (10)

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(Regulation-2021)

Semester : **II** Time:3 Hours

Course Code &Title : **ES104 : FUNDAMENTALS OF ELECTRICAL, ELECTRONICS ENGINEERING** Max Marks:100

PART-A (10×2=20 Marks)

Answer all the questions within two to three sentences

1. Define Resistance.
2. What are the different types of Flip – Flop?
3. Write the applications of Op-Amp?
4. Draw the diagram of Differentiator.
5. Define the term of Self Inductance?
6. State Lenz's law?
7. Define RMS Value?
8. Define Form Factor.
9. What is Step up Transformer and Step down Transformer?
10. What is Transformer Ratio?

PART-B ((6+10)×5=80 Marks)

Answer all the questions in detail

11. A. Write a short note on difference between Active and Passive Components. (6)

    B. Explain the working principle and applications of FET with suitable diagram. (10)

(OR)

    C. Briefly explain about T Flip – Flop with appropriate diagram. (6)

    D. Briefly explain about SR Flip – Flop and JK Flip – Flop with appropriate diagram. (10)

12. A. An inverting amplifier has $R_f = 500k\Omega$ and $R_1 = 5k\Omega$. Determine the amplifier circuit voltage gain. Input resistance and output resistance. Determine also the output voltage and input current if the input voltage is 0.1V. Assume op-amp to be ideal one. (6)

	B.	Define op-amp as an inverting amplifier and drive an expression for its output voltage.	(10)
		(OR)	
	C.	Compare the ideal and practical op-amp.	(6)
	D.	Derive an expression for output voltage of op-amp as differentiator and mention its applications.	(10)
13.	A.	Explain Hysteresis loop with suitable diagram.	(6)
	B.	Define the following terms of (i) Current, (ii) MMF, (iii) Magnetic Force, (iv) Energy, (v) Power	(10)
		(OR)	
	C.	Explain Faraday's laws of electromagnetic induction.	(6)
	D.	Write a short note about (i) Statically and Dynamically Induced EMF (ii) Self and Mutual Inductance.	(10)
14.	A.	Write a short note on Power Triangle.	(6)
	B.	Write the Voltage and Current relationship in Star and Delta Connections.	(10)
		(OR)	
	C.	A circuit consisting of resistor in series with a capacitor takes 80W at PF of 0.4 from a 100V, 50Hz supply. Find the resistance and capacitance.	(6)
	D.	Write the expression for Power and Power Factor in RL Series Circuit.	(10)
15.	A.	Briefly explain the types of DC Motors.	(6)
	B.	Briefly explain the construction and working principle of DC Motor with Relevant characteristics.	(10)
		(OR)	
	C.	Derive the Emf equation of Transformer.	(6)
	D.	Explain the construction and working principle of Transformer and also mention different types of Transformers.	(10)

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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. Define force. What is the unit of moment in the S.I system?
2. Two forces, 500N and 700N are acting at an angle 50° to each other. Find the magnitude and direction of the resultant.
3. What are the conditions for a body to be in equilibrium?
4. Illustrate with a simple sketch, the different types of loads acting on a beam.
5. Define limiting friction.
6. Write two advantages and two disadvantages of friction.
7. What is centre of gravity and centre of mass?
8. Draw neat sketch, the centroid of quarter circle.
9. Define mechanical advantage and efficiency of a machine.
10. What is a reversible machine? What is the condition for a machine to be reversible?

PART-B **(**(6+10)×5=80 Marks)

Answer all the questions in detail

11. A. State Polygon law of forces. Prove it using Triangle law. (6)

    B. The following forces act at a point- (10)

    i. 20N inclined at 30° to the North of East

    ii. 25N towards North

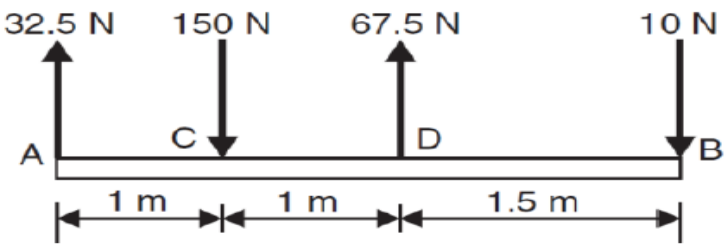
    iii. 30N inclined at 45° towards North-West

    iv. 35N inclined at 40° to the South of West.

    Find the magnitude of the resultant of the force system.

    (OR)

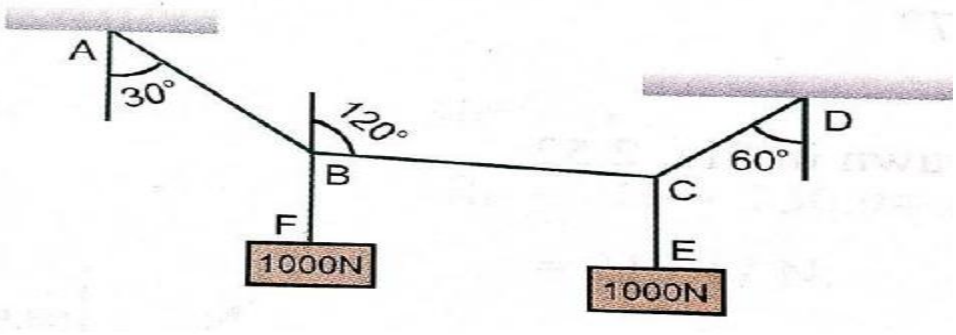
    C. A system of parallel forces are acting on a rigid bar as shown in the figure. (6)
    Reduce the system to- i. A single force, ii. A single force and couple at A.



D. State and prove Parallelogram law of forces. (10)

12. A. State and prove Lami's theorem. (6)

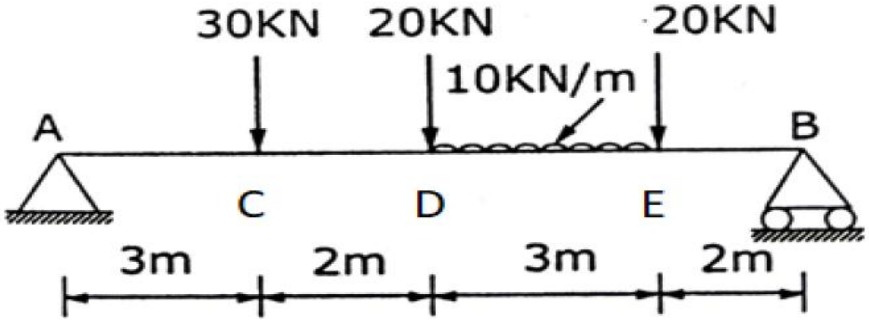
B. A string ABCD, attached to two fixed points A and D has two equal weights of 1000 N attached to it at B and C. The weights rest with the portions AB and CD inclined at angles of 30° and 60° respectively, to the vertical as shown in fig. Find the tensions in the portions AB, BC and CD of the string, if the inclination of the portion BC with the vertical is 120°. (10)



(OR)

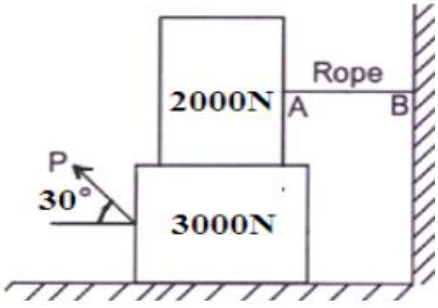
C. A 12-m long cantilever beam carries a point load of 40 kN at 3 m from the fixed end and a uniformly distributed load of 10 kN/m for a span of 6 m from the free end of the beam. Find the support reactions in the beam. (6)

D. Find the reactions at the supports A and B of the beam as shown in fig. (10)



13. A. Derive the relation between angle of friction and coefficient of friction. (6)

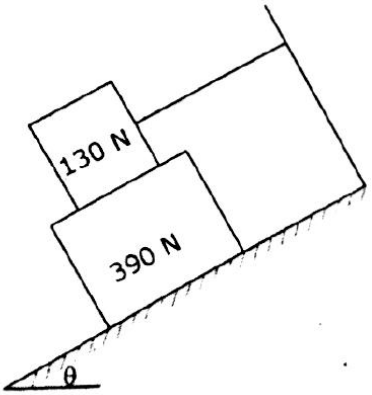
B. For the blocks shown in fig. Find the value of pull 'P'. The coefficient of friction between blocks is 0.24 and the same between block and floor is 0.3. (10)



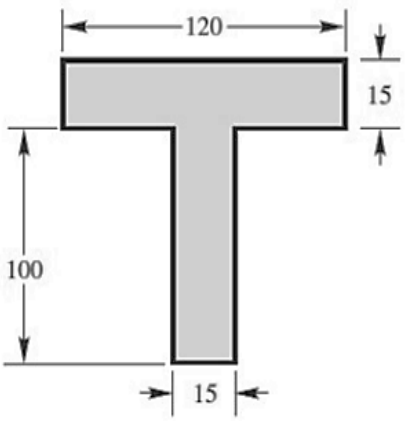
(OR)

C. Differentiate friction. Write down the laws of static friction. (6)

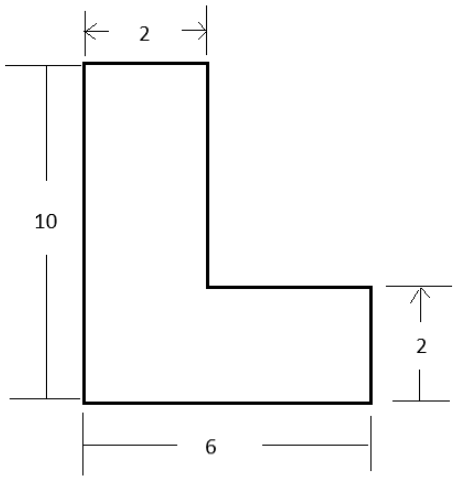
D. What should the value of the angle θ of inclined plane in fig. below which will make the motion of 390 N block down the plane to impend? The co-efficient of friction for all contact surfaces is 1/3. (10)



14. A. Find the centroid of the given T section as shown in the figure (All the dimensions are in mm). (6)

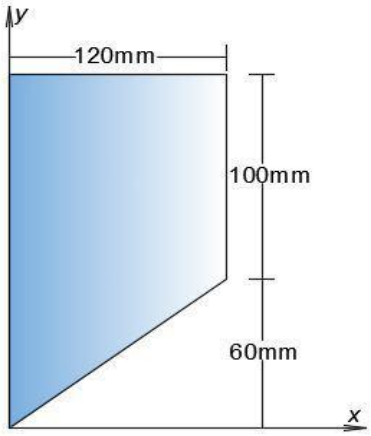


B. Find the centroid of the given L section as shown in the figure (All the dimensions are in m). (10)

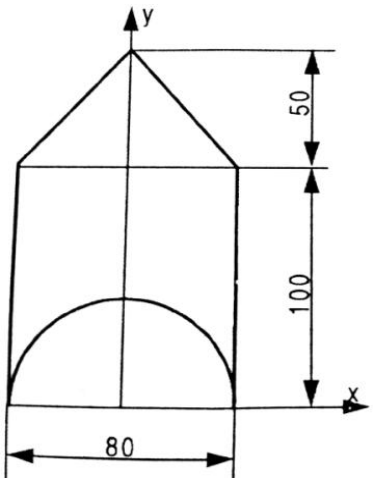


(OR)

C. Determine the position of the centroid of the given geometry. (6)



D. Find the position of the centroid of the solid combination as shown in fig. and consisting of a solid cone of height 50 mm, base diameter 80 mm, cylinder of height 100 mm with a hemispherical cut as shown in fig. (10)



15. A. Establish the relation between mechanical advantage, velocity ratio and efficiency of a machine. (6)

B. In a lifting machine an effort of 450N is to be moved by a distance of 27m to lift a load of 9000N by a distance of 0.9m. Find the mechanical advantage, velocity ratio, efficiency, effort loss in friction and the ideal effort. (10)

(OR)

C. Calculate the V.R of a simple screw jack with a neat sketch. (6)

D. A differential axle and wheel consists of a differential axle of 240 mm and 320 mm diameter and a wheel of 750 mm diameter. Assuming the efficiency to be 57%, find the V.R, M.A, and the effort required to lift a load of 25 kN. (10)

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