BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1   B. Sc. Engineering Examinations 2021-2022

Sub : **CE 101** (Analytic Mechanics)

Full Marks : 210   Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) For the simply supported beam shown in Fig. 1, calculate the reactions at the supports A and B.   **(10)**
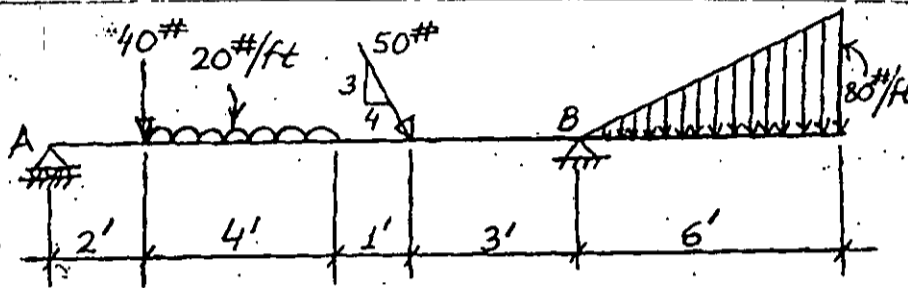

Figure: 1

(b) In Fig. 2, the bodies A and B weigh 100 and 150 lb respectively. The coefficient of friction for all surfaces is 0.3. The cord is parallel to the inclined plane CD. Calculate the angle θ and tension in the cord when motion of the body B impends down the plane CD.   **(12)**
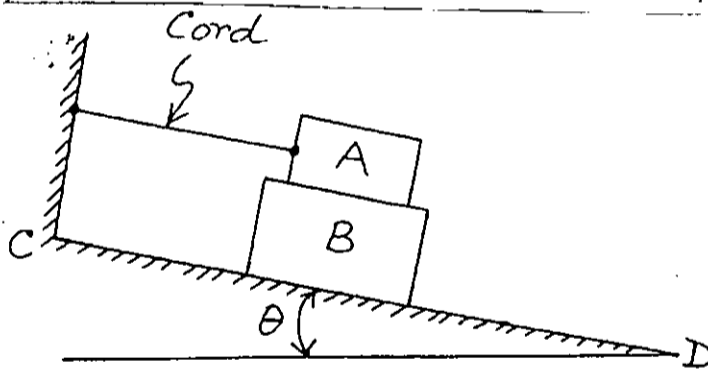

Figure: 2

(c) The cantilever frame shown in Fig. 3 consists of two horizontal members AC and DF, a vertical member BE and an inclined member CF. All the members have been assumed to be weightless. Calculate the components of pin reactions at A and D, and force in the member CF.   **(13)**
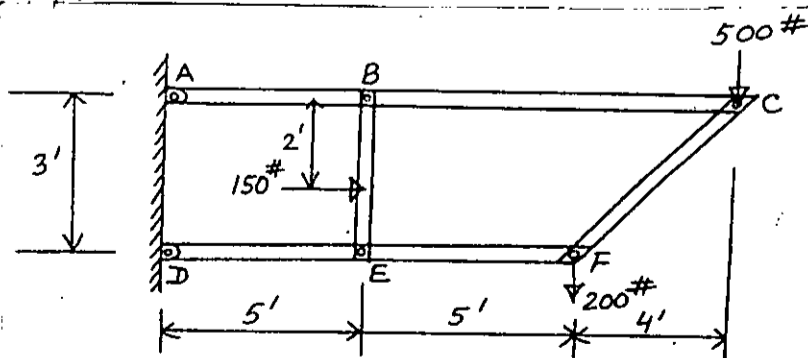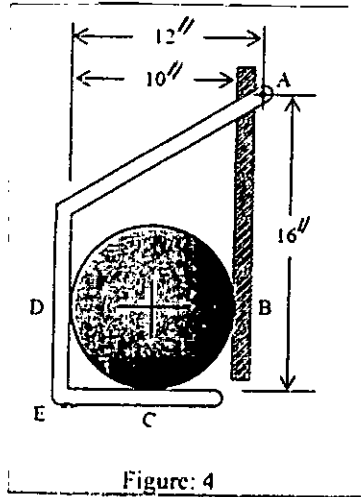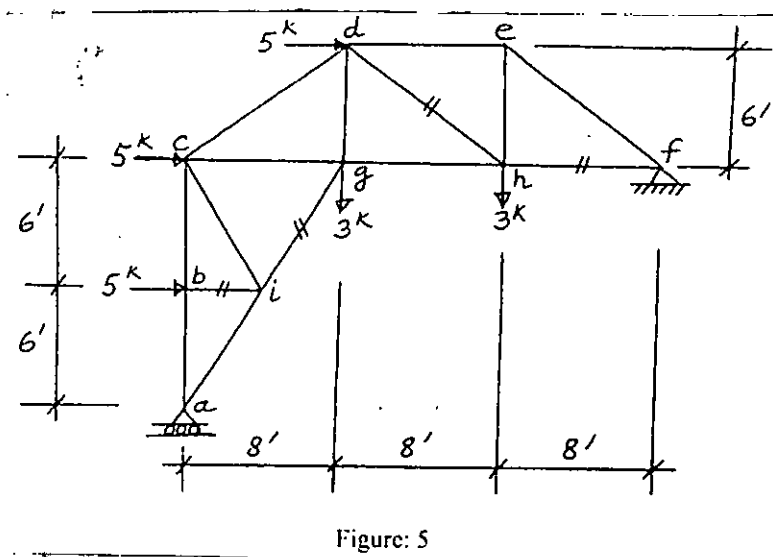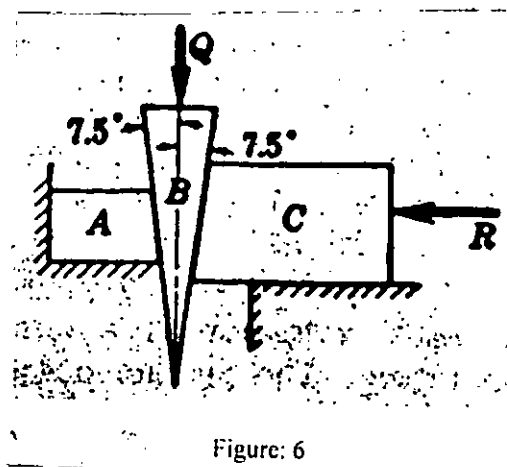

Figure: 3

CE 101

2. (a) A pipe is supported by hanger rods AE as shown in Fig. 4. The hanger is pivoted at pin A. If the pipe section weighs 1000 lb compute the reactions at A, B and C. Neglect the weight of the hanger. **(11)**

Figure: 4

(b) For the truss shown in Fig. 5, determine the force in the members bi, gi, dh and fh. **(12)**

Figure: 5

(c) A wedge is inserted between a fixed surface A and a movable block C which weighs 4000 lb as shown in Fig. 6. If there is a horizontal resistance acting on C of R = 8000 lb, what force Q will impose impending motion of C? **(12)**

Figure: 6

CE 101

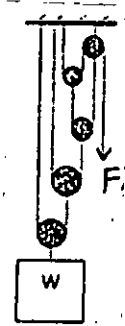3. (a) Determine the required force F to lift the weight W using the pulley system shown in Fig. 7. **(6)**

Figure: 7

(b) The section of a concrete dam is shown in Fig. 8. The water is considered to be always at the top, AB. What is the value x when the moment of the weight of the dam resisting the overturning is twice the moment of the water pressure which tends to overturn the dam? Let the weight of concrete and water be 150 and 62.5 lb. per cu.ft., respectively. Neglect the effect of the restraints at the ends of the dam. **(15)**

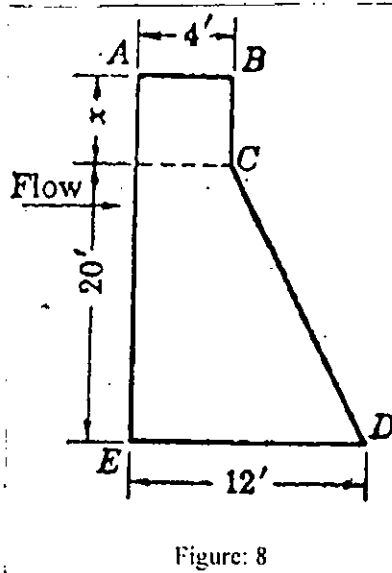Figure: 8

(c) Fig. 9 shows a boom made of two timbers AB and AC. The cable AE holds the timbers in a horizontal plane and supports a vertical load of 1000 lb. The line BC is the intersection of the horizontal plane of the boom with the vertical plane BCGF. Determine the force in the timbers AB and AC and tension in the cable AE. Given, AB = 12', AC = 15', AD = 8' and DE = 10'. **(14)**

Figure: 9

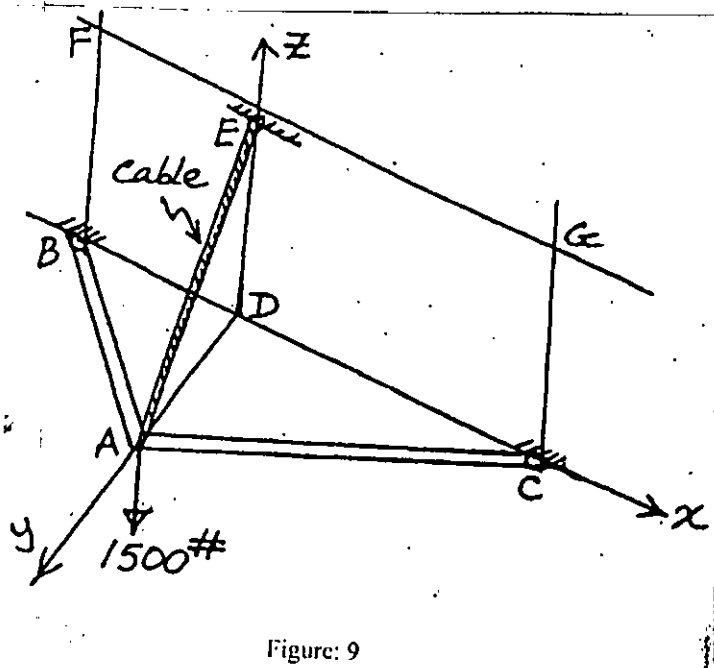# CE 101

4. (a) The body A in Fig. 10 weighs 250 lb. The coefficients of static friction are 0.35 between the body A and the inclined plane, and 0.25 between the rope and the drums. What value of W will cause motion of the body A to impend up the plane? Is the motion sliding or overturning? **(15)**
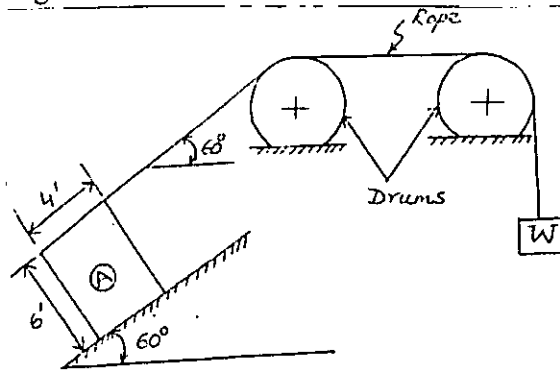
Figure: 10

(b) Determine the least radius of gyration of the shaded area of Fig. 11. **(20)**
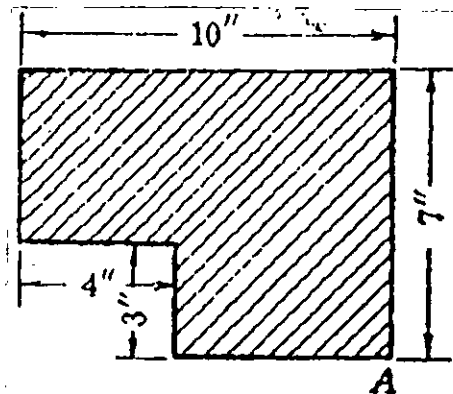
Figure: 11

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) A wire weighing 1.2 lb per ft is strung between two supports 400 ft apart. One support is 20 ft higher than the other and the sag, measure from lower support, is 10 ft. Compute the tension at each support and the length of wire. Assume the curve to be parabolic. **(15)**

(b) Locate the centroid of a hemisphere. **(20)**

6. (a) Derive an expression for the moment of inertia of a homogenous right circular cylinder about a diameter of its base. **(15)**

(b) In Fig. 12, W_A = 1000 lb, W_B = 430 lb and f = 1/3 and the pulleys C and D are to be considered frictionless and weightless. Find the velocity of A 12 sec. after it is released from rest. **(20)**

Fig. 12

CE 101

7. (a) A particle moves along the x-axis with an initial velocity v_x = 50 ft/sec at the origin when t = 0. For the first 4 seconds it has no acceleration, and thereafter it is acted on by a retarding force which gives it a constant acceleration a_x = −10 ft/sec^2. Calculate the velocity and the x-coordinate of the particle for the conditions of t = 8 sec and t = 12 sec and find the maximum positive x-coordinate reached by the particle. **(11)**
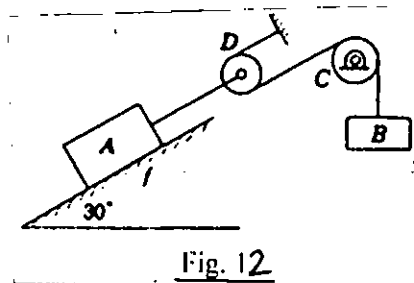
(b) In Fig. 13, the 50-kg block at A is mounted on rollers so that it moves along the fixed horizontal rail with negligible friction under the action of the constant 300-N force in the cable. The block is released from rest at A, with the spring to which it is attached extended an initial amount x_1 = 0.233 m. The spring has a stiffness k = 80 N/m. Calculate the velocity v of the block as it reaches position B. **(12)**

Fig. 13
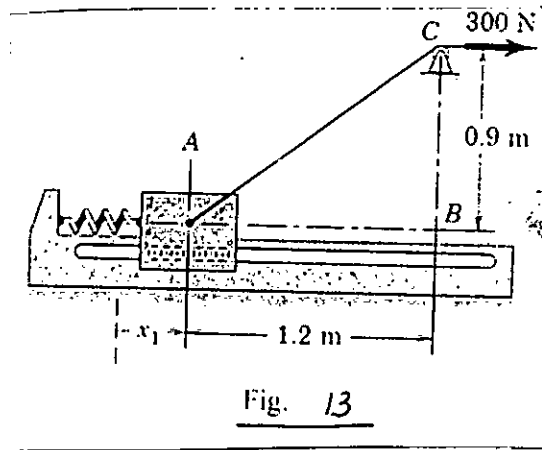
(c) A block of wood A of mass 10 kg is held on a rough horizontal table. An elastic string connected to the block passes over a smooth pulley at the end of the table and then under a second smooth pulley carrying a body B of mass 5 kg as shown in Fig. 14. The other end of the string is fixed to a point above the second pulley. When the 10 kg block is released, it moves with an acceleration of g/9. Determine the value of coefficient of friction between the block and the table. **(12)**

Fig. 14

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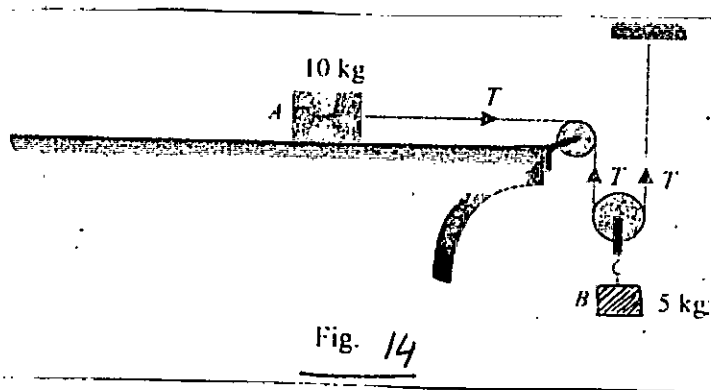
CE 101

8. (a) Two beams AC and CD of length 9 m and 10 m respectively are hinged at C. These are supported on rollers at the left and right ends (A and D). A hinged support is provided at B, 7 m from A as shown in Fig. 15. Using the principle of virtual work, determine the reaction at the support B, when the beam is loaded as shown in Fig. 15. **(11)**

Fig. 15
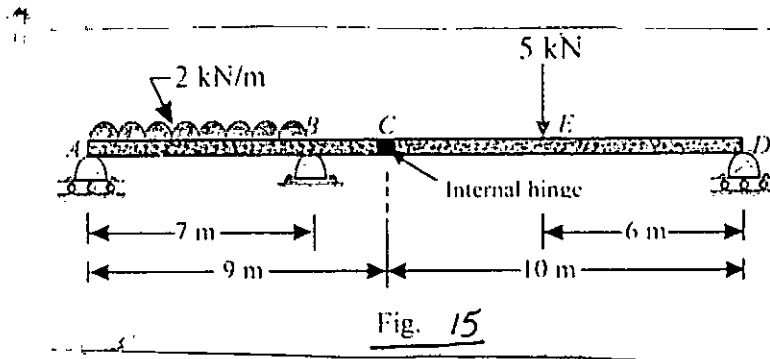
(b) A slender rod having a mass m and length l is pinned at one end to a horizontal plane. The rod, initially at a vertical position, is allowed to fall. See Fig. 16. What will be its angular speed when it strikes the floor? **(12)**

Fig. 16
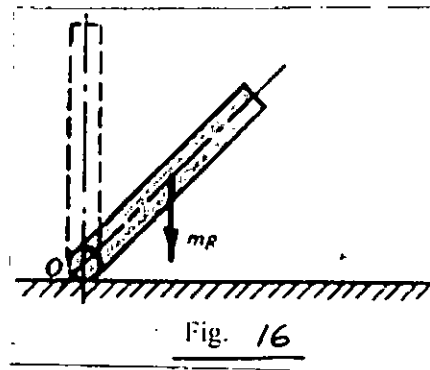
(c) Determine the angle θ for the equilibrium of the two-member linkage shown in Fig. 17. Each member has a mass of 10 kg. The spring is unstretched when $\theta = 0°$. **(12)**

Fig. 17

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1   B. Sc. Engineering Examinations 2021-2022

Sub : **MATH 137** (Differential and Integral Calculus, Matrices)

Full Marks : 210   Time : 3 Hours
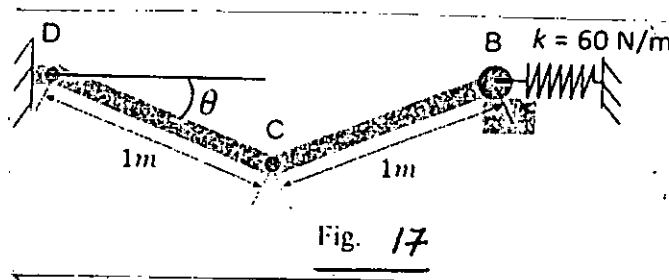
The figures in the margin indicate full marks.

Symbols used have their usual meaning.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE** questions.

1. (a) Discuss the continuity and differentiability of the function **(12)**

$$f(x) = \begin{cases} 5x - 4, & 0 < x \le 1 \\ 4x^2 - 3x, & 1 < x \le 2 \\ 3x + 4, & x > 2 \end{cases} \quad \text{at the point } x = 1.$$

Also, sketch the graph of the function and interpret your answer.

(b) Evaluate: $\displaystyle \lim_{x \to 0} \left[\frac{2(\cosh x - 1)}{x^2} \right]^{1/x^2}$. **(11)**

(c) Find the n-th derivative of $y = \sin^5 x \cos^4 x$. **(12)**

2. (a) State Leibntz's theorem. If $y = x \cos(\ln x)$, then find the value of the expression: **(12)**

$xy_{n+2} + (2n - 1)y_{n+1}$.

(b) Expand the polynomial $2x^3 + 7x^2 + x - 1$ in power of $(x - 2)$. **(11)**

(c) Verify Cauchy's mean value theorem for the functions $f(x) = x^2 - 2x + 3$ and $g(x) = x^3 - 7x^2 + 26x - 5$ in the interval $[-1, 1]$. **(12)**

3. (a) The strength S of a rectangular beam is proportional to the product of its width w times the square of its depth d. Find the dimensions of the strongest beam that can be cut from a cylindrical log of radius r as shown in the following figure: **(12)**

Fig. Cutting a beam
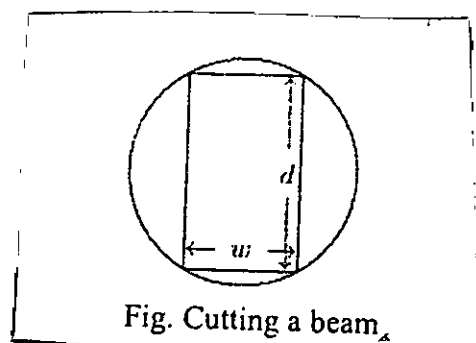
(b) State Euler's theorem of homogeneous function. If $u = \tan^{-1}\left[(x^3 + y^3)/(x + y)\right]$, show that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = \sin 2u$. **(11)**

(c) Find the pedal equation of the parabola $y^2 = 4ax$ with respect to its focus. **(12)**

MATH 137/CE

4. (a) Evaluate the integral: $\int \dfrac{dx}{x^{5/3}(2-x)^{1/3}}$. **(11)**

    (b) Evaluate the integral: $\int \dfrac{x^4 + 6x^3 + 10x^2 + x}{x^2 + 6x + 10}\, dx$. **(12)**

    (c) Derive a reduction formula for $I_{m,n} = \int \sin^m x \cos^n x\, dx$, and hence evaluate $\int \sin^5 x \cos^4 x\, dx$. **(12)**

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) Apply properties of definite integrals to prove that **(15)**

$$\int_0^{\pi/2} \log \sin x\, dx = \int_0^{\pi/2} \log \cos x\, dx = -\frac{\pi}{2}\log 2$$

    (b) Derive the relationship between Gamma and Beta functions. Hence show that **(10)**

    $\Gamma(1/2) = \sqrt{\pi}$.

    (c) Use Beta function to compute $\displaystyle\int_0^{\pi} \frac{dt}{\sqrt{3 - \cos t}}$. **(10)**

6. (a) Find the value of $\displaystyle\int_0^{\infty}\int_0^{\infty} e^{-\left(x^2 + y^2\right)}\, dy\, dx$ by changing to polar coordinates. Hence, deduce that $\displaystyle\int_0^{\infty} e^{-x^2}\, dx = \frac{\sqrt{\pi}}{2}$. **(12)**

    (b) The second floor of a warehouse contains 240 square meters of useable floor space and can safely hold a total load of 1,000 kg., if the load is distributed relatively evenly. The Cannon Hill furniture Company produces tables and chairs and wants to storage the products in the warehouse. But the product tables require 4 sq.meters of space for storage and weight 20 kgs per unit and the product chairs require 3 sq.meters of space and weight 10 kgs per unit. What quantities of tables and chairs will fill the second floor of the warehouse and just reach the safe load of the floor? (Use matrix algebra). **(8)**

    (c) Write down algorithm to find inverse of a non-singular matrix using elementary row operations. Hence, find the inverse of the following matrix using the algorithm. **(15)**

$$A = \begin{bmatrix} 1 & 0 & 1 & 2 \\ -1 & 1 & 2 & 1 \\ 1 & 0 & 1 & 1 \\ 3 & 0 & 0 & 2 \end{bmatrix}$$

MATH 137/CE

7. (a) Define Rank of a matrix. Convert the following matrix into its normal form and hence find its rank. **(15)**

$$A = \begin{bmatrix} 2 & -4 & 3 & -1 & 0 \\ 1 & -2 & -1 & -4 & 2 \\ 0 & 1 & -1 & 3 & 1 \\ 4 & -7 & 4 & -4 & 5 \end{bmatrix}$$

(b) Write down an algorithm to solve a system of linear equations $AX = b$ by Gaussian elimination method. **(5)**

(c) Determine the values of λ for which the following set of equations may posses non-trivial solution and solve them in each case **(15)**

$3x_1 + x_2 - \lambda x_3 = 0, \ 4x_1 - 2x_2 - 3x_3 = 0, \ 2\lambda x_1 + 4x_2 + \lambda x_3 = 0.$

8. (a) Define eigenvalues and eigenvectors. Give geometrical interpretation of eigenvectors. Describe applications of eigenvalues and eigenvectors. **(10)**

(b) Find LU decomposition of the matrix $A = \begin{bmatrix} -3 & 12 & -6 \\ 1 & -2 & 2 \\ 0 & 1 & 1 \end{bmatrix}$. **(10)**

(c) State Cayley-Hamilton theorem. Apply the theorem to compute A^{-1} and A^4, where **(15)**

$$A = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 5 & -1 \\ 1 & 1 & 3 \end{bmatrix}.$$

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1   B. Sc. Engineering Examinations 2021-2022

Sub : **PHY 101** (Physical Optics, Waves and Oscillations and Heat & Thermodynamics)

Full Marks : 210   Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE** questions.

1. (a) What do you understand by coherent and incoherent waves? Why are coherent sources required to create interference of light? **(8)**

   (b) (i) Derive the formula of wavelength of light used in the Newton's rings experiment and discuss how the wavelength of sodium light is determined by this experiment, and (ii) why the rings are circular? **(17+3=20)**

   (c) In Newton's rings experiment, the convex surface of a plano-convex lens with curvature radius 40 cm comes into contact with a glass plate. A certain ring observed in reflected light has a radius 2.5 mm. Watching the given ring, its radius is made 1.5 mm by gradually upholding the lens from the plate. At what distance from the plate is the lens upheld to produce that ring? **(7)**

2. (a) What do you understand by diffraction of waves? Distinguish between Fresnel and Fraunhofer classes of diffraction of light? **(8)**

   (b) Derive an expression for the intensity at a point in the Fraunhofer type of diffraction produced by two nearby parallel narrow slits. Draw a diagram to indicate the intensity distribution in this case. **(20)**

   (c) Light, which is a mixture of two wavelengths 500 nm and 520 nm, is incident normally on a plane transmission grating having 10000 lines per cm. A lens of focal length 150 cm is used to observe the spectrum on the screen. Calculate the separation in cm of the two lines in the first order spectrum. **(7)**

3. (a) Distinguish between ordinary and polarized light. Write down Brewster's law. **(8)**

   (b) (i) What are retardation plates? Explain them and state their use, (ii) describe how, with the help of a polarizing sheet and a quarter wave plate, plane polarized light, circularly polarized light and elliptically polarized light are detected, and (iii) explain the phenomenon of double refraction either in a calcite or a quartz crystal. **(20)**

   (c) A plane polarized light wave of amplitude E_0 falls on a calcite quarter-wave plate with its plane of vibration at 45° to the optic axis of the plate, which is taken as y-axis. The emerging light will be circularly polarized. In what direction will the electric vector appear to rotate? **(7)**

PHY 101/CE

4. (a) Distinguish between progressive and standing waves. **(7)**

(b) Show that, in the case of a stationary wave, no energy is transferred across any section of the medium. **(18)**

(c) A plane progressive wave is represented by the equation, **(10)**

$$y = 0.27 \sin\frac{\pi}{65}\left(68000t - 2x\right) \text{ cm.}$$

If the wave is travelling through the medium of density 0.00129 g/cm³, find the flow of energy across a square centimeter per second.

SECTION – B
There are **FOUR** questions in this section. Answer any **THREE** questions.

5. (a) What is a torsion pendulum? Show that for small angular displacement, the motion of a torsion pendulum is simple harmonic. **(7)**

(b) Derive a general expression for the combination of two simple harmonic motions (SHMs) acting at the right angle to each other, having time periods in the ratio of 2:1. From the expression, find out the equation of a parabola. **(18)**

(c) Two SHMs acting simultaneously on a particle are given by, $y_1 = \sin\left(\omega t + \frac{\pi}{3}\right)$ and

$y_2 = 2\sin\omega t$. Find the equation of the resultant vibration. **(10)**

6. (a) Discuss the acoustic requirements of a good auditorium. **(5)**

(b) State the assumptions of Sabine for a closed room. Show that the growth and decay of intensity of sound in a room is exponential. Derive an expression for reverberation time. **(20)**

(c) The volume of a room is 500 m³. The wall area of the room is 220 m², the floor area is 120 m², and the ceiling area is 100 m². The average sound absorption coefficient, (i) for the walls is 0.03, (ii) for the ceiling is 0.8, and (iii) for the floor is 0.06. Calculate the average sound absorption coefficient and the reverberation time. **(10)**

7. (a) What is the basic principle of a Platinum resistance thermometer? For a Platinum resistance thermometer, obtain the equation of the principle of temperature. Hence show that, **(13)**

$$t - t_p = \delta\left\{\left(\frac{t}{100}\right)^2 - \frac{t}{100}\right\}$$

Where the symbols have their usual meanings.

PHY 101/CE

Contd ... Q. No. 7

(b) What is Degrees of freedom? In case of oxygen and carbon-di-oxide (CO_2) gases at room temperature and at high temperature,　　　　　　　　　　　　　　　　　　**(12)**

　　　(i) Find the degrees of freedom.

　　　(ii) Stating the principle of Equipartition of energy, obtain C_P, C_V and γ, where the symbols have their usual meanings.

(c) If the platinum temperature, corresponding to 50 °C on the gas scale is 50.25 °C, what will be the temperature on the platinum scale corresponding to 150 °C on the gas scale?　　**(10)**

8. (a) State Zeroth law of thermodynamics. In case of real gas show that,　　　　　　**(15)**

$$C_P - C_V = R\left\{1 + \frac{2a}{RTV^3}\,(V - b)^2\right\}$$

Where the symbols have their usual meanings.

(b) What is Entropy? Show that, entropy of a thermodynamic system depends only upon its initial and final state, not on paths.　　　　　　　　　　　　　　　　　　**(10)**

(c) An ideal gas is taken in a cyclic process as shown in the Fig. 8(b).　　　　　　　**(10)**

Fig. 8(b)
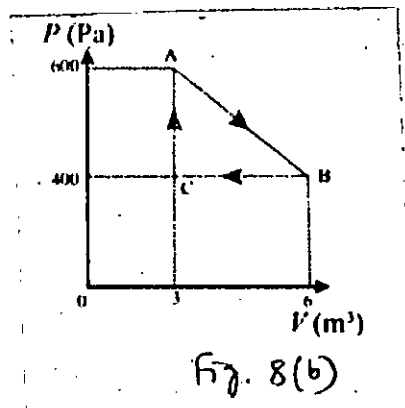
Calculate,

　　　(i) Work done by the gas

　　　(ii) Work done on the gas and

　　　(iii) Net work done in the process

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1   B. Sc. Engineering Examinations 2021-2022

Sub : **CHEM 103** (Chemistry I)

Full Marks : 210   Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) Discuss the first law of thermodynamics. Define closed and isolated systems. **(10)**

   (b) Differentiate enthalpy and internal energy. Construct two calorimeters to measure a reaction's enthalpy and internal energy change. **(15)**

   (c) How is the food fuel value calculated? Use the following data to compare the quality of fuels. **(10)**
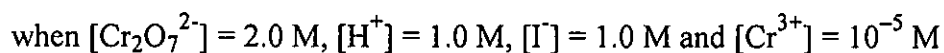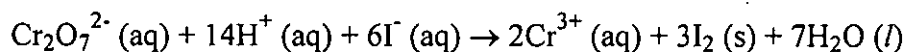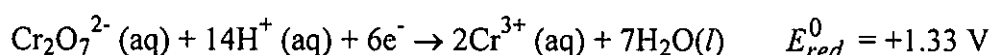
	Approximate elemental composition (Mass%)			Fuel Value (kJ/g)
	C	H	O	
Wood	50	6	44	18
Anthracite coal	82	1	2	31
Bituminus coal	77	5	7	32
Charcoal	100	0	0	34
Crude Oil	85	12	0	45
Gasoline	85	15	0	48
Natural gas	70	23	0	49
Hydrogen	0	100	0	142

2. (a) State and rationalize the effects of change in concentrations, electrode area, and temperature on the emf of the cell. **(10)**

   (b) Discuss the working principle of a pH electrode. Construct a pH electrode and define its components. **(15)**

   (c) Calculate a voltaic cell's standard emf and real emf at 298 K, where the following reaction proceeds. **(10)**

   $$Cr_2O_7^{2-} (aq) + 14H^+ (aq) + 6I^- (aq) \rightarrow 2Cr^{3+} (aq) + 3I_2 (s) + 7H_2O (l)$$

   when $[Cr_2O_7^{2-}] = 2.0$ M, $[H^+] = 1.0$ M, $[I^-] = 1.0$ M and $[Cr^{3+}] = 10^{-5}$ M

   The standard reduction potentials are

   $$Cr_2O_7^{2-} (aq) + 14H^+ (aq) + 6e^- \rightarrow 2Cr^{3+} (aq) + 7H_2O(l) \qquad E^0_{red} = +1.33 \text{ V}$$

   $$I_2(s) + 2e^- (aq) \rightarrow 2I^- (aq) \qquad E^0_{red} = +0.54 \text{ V}$$

CHEM 103/CE

3. (a) Use the concept of conjugate acids and bases to define strong acids and weak acids. **(10)**

(b) Relate the nature of cation and anion to determine the relative acidity and basicity of the aqueous salt solutions. **(15)**

(c) Draw a plot representing the titration curves of 50 mL 0.1 M different acids with 0.1 M NaOH. The K_a values of the acids are 10^{-2}, 10^{-4}, 10^{-6} and 10^{-8}. **(10)**

4. (a) Write the relation of Gibbs free-energy with enthalpy and entropy. Identify entropy-driven process and enthalpy-driven process. **(10)**

(b) Explain the factors that determine the solubility of gases in a solvent. **(15)**

(c) Ascorbic acid (vitamin C, $C_6H_8O_6$) is a water-soluble vitamin. A solution containing 80.5 g of ascorbic acid dissolved in 210 g of water has a 1.22 g/mL density at 55 °C. Calculate the different concentration expressions of ascorbic acid in the solution. **(10)**

     (i) the mass percentage,

     (ii) the mole fraction

     (iii) the molality

     (iv) the molarity,

     (v) parts per million.

SECTION – B
There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) State the fundamental differences between classical and quantum mechanical model of atomic structure. Discuss the significance of azimuthal quantum number and magnetic quantum number. **(15)**

(b) Calculate the wavelength (in nm) of the radial line of Balmer series with maximum frequency. Given that, $R_H = 10973731.6 \text{ m}^{-1}$. **(10)**

(c) Carbon atom has total 6 electrons in it. Any two of those electrons can never have the exact same value for all the quantum numbers – why? Show this by comparing the quantum numbers of any $2s$ and $2p$ electrons of carbon atom. **(10)**

6. (a) Define hydrogen bonding. HF and H_2O both contain hydrogen bonding but HF is gas at room temperature while H_2O is liquid – justify. **(15)**

(b) State VSEPR theory. Compare the polarity of BF_3 and NH_3 by drawing their structures according to VSEPR theory. **(10)**

(c) Solid $FeCl_2$ does not conduct electricity but solid Fe does – why? **(10)**

CHEM 103/CE

7. (a) Define diagonal relationship. N and O atoms do not follow the trend of increasing ionization energy across the period – explain. **(15)**

(b) At equilibrium, for the reaction $CaCO_3$ (s) $\rightleftharpoons$ CaO (s) + CO_2 (g), the pressure of the reaction mixture is 0.105 atm at 350 °C. Calculate K_p and K_c for this reaction. **(10)**

(c) The equilibrium constant K_p for the reaction PCl_5 (g) $\rightleftharpoons$ PCl_3 (g) + Cl_2 (g) is 1.05 at 250°C. The reaction starts with a mixture of PCl_5, PCl_3, and Cl_2 at pressures 0.177 atm, 0.223 atm, and 0.111 atm, respectively, at 250°C. When the mixture comes to equilibrium at that temperature, which pressures will have decreased and which will have increased? Explain why. **(10)**

8. (a) Define associated colloids. The concept of colloid formation is used in the cleansing action of soap and detergent – explain. **(15)**

(b) What is sol? Discuss peptization method to prepare sol. **(10)**

(c) A colloidal system can be differentiated from a suspension by monitoring the movement of the colloidal particles – explain. **(10)**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1   B. Sc. Engineering Examinations 2021-2022

Sub : **HUM 355** (Sociology)

Full Marks : 140   Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) What were the social, economic, and political effects of the industrial revolution? $(13\frac{1}{3})$

    (b) Discuss the benefits and drawbacks of bureaucracy while identifying its primary characteristics.   **(10)**

2. (a) Why do people act differently, and how do sociologists categories them as deviants? $(13\frac{1}{3})$

    (b) Demonstrate Harris and Ullman's model on urban growth.   **(10)**

3. (a) Show how the structure of traditional and modern societies has changed. $(13\frac{1}{3})$

    (b) Critically examine the Malthusian theory of population.   **(10)**

4. Write short notes on any **THREE** of the following $(23\frac{1}{3})$

    (a) Flying shuttle
    (b) Capitalism
    (c) Post-industrial society
    (d) Climate change

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) 'Sociological imagination is an empowering tool, allows us to look beyond our limited experiences'. – Explain this statement with suitable examples.   **(10)**

    (b) Critically discuss the functionalist theoretical perspective of sociology. $(13\frac{1}{3})$

6. (a) Can you explain Mead's perspective on socialization and how it contributes to the creation of an individual's sense of self and their ability to interact with others in society?   **(10)**

    (b) In what ways does socialization influence and mold human behavior, and what are the key agents of socialization that play a role in this process? $(13\frac{1}{3})$

HUM 355

7. (a) What are the ways in which language shapes and reflects cultural values, beliefs, and social practices? **(10)**

(b) How do social norms and social values regulate behavior and construct society's expectations for individuals? **(13⅓)**

8. Write short notes on any **THREE** of the following: **(23⅓)**

    (a) Conflict theoretical perspective

    (b) Primary socialization and re-socialization

    (c) Subculture, counter culture and ethnocentrism

    (d) Universal systems of social stratification

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA
L-1/T-1   B. Sc. Engineering Examinations 2021-2022
Sub : **HUM 375** (Government)
Full Marks : 140   Time : 3 Hours
The figures in the margin indicate full marks.
USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A
There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) Discuss the meaning and significance of sovereignty as a constituent element of a state. $(11\frac{1}{3})$

   (b) Write an analytical note on nationalism.   **(12)**

2. (a) Analyze the functions of the Legislature in a state. $(11\frac{1}{3})$

   (b) What do you understand by rights? Discuss briefly the legal rights and duties of a citizen in a state.   **(12)**

3. (a) Describe the conditions which are necessary for the success of democracy. $(11\frac{1}{3})$

   (b) Make a comparison between parliamentary and presidential form of government.   **(12)**

4. Write short notes on any three (3) of the following $(23\frac{1}{3})$

   (a) Good governance
   (b) Non-political executive
   (c) Rule of law
   (d) Theory of surplus value

SECTION – B
There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) What is public policy? Explain the major typologies of policies with relevant examples. $(11\frac{1}{3})$

   (b) What is Non Government Organization? Discuss the major function areas of NGOs in developing countries.   **(12)**

6. (a) Define bureaucracy. Examine the features of Max Weber's ideal type of bureaucracy. $(11\frac{1}{3})$

   (b) Write on the concept of e-government. Describe the actors and factors for implementing e-government.   **(12)**

7. (a) Describe the characteristics of the constitution of Bangladesh. $(11\frac{1}{3})$

   (b) What is foreign policy? Discuss the determinants of the foreign policy of Bangladesh.   **(12)**

8. (a) Analyze the significance of the language movement of 1952. $(11\frac{1}{3})$

   (b) Describe the functions of the local government institutions of Bangladesh.   **(12)**