L-1/T-1/CE   Date : 10/07/2013
BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA
L-1/T-1   B. Sc. Engineering Examinations 2012-2013
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) The frame shown in Fig. 1 consists of two horizontal members AE and BF, a vertical member EF and an inclined member CD. All the members have been assumed to be weightless. Calculate the components of pin reactions at A and force in the member EF.   **(13)**

    (b) The body A weighting 500 N rests over body B weighing 1000 N as shown in Fig. 2. If the coefficient of static friction between A and B is 0.25 and between B and the floor is 0.20, what should be the value of force P that will cause the body B to have impending motion toward right?   **(12)**

    (c) With neat figures derive an expression for the total length of a symmetrical catenary in terms of tension at the low point (Q), spaw length (L) and weight per foot (w) of the catenery.   **(10)**

2. (a) The body A shown in Fig. 3 weights 150 lb. The coefficient of static friction between the body A and the inclined plane is 0.5. The coefficient of static friction between the rope and each drum is 0.4. What value of W will cause motion of the body A to impend up the plane?   **(12)**

    (b) A flexible cable weighing 1.5 lb/ft is strung between two supports. One support is 300 ft higher than the other and the sag measured from the lower support is 200 ft. The tension in the cable at the upper support is 12000 lb. calculate the following: **(11)**

      (i) Distance between the two supports

      (ii) Total length of the cable

      (iii) Slope in degree at the lower support.

      (iv) Tension at the lower support.

    (c) A slender brass rod of uniform cross-section is welded at the centre of the base of a cast-iron cylinder as shown in Fig. 4. Weight of the brass rod and unit weight of cast-iron are 20 lb and 490 lb/ft^3, respectively. Calculate the radius of gyration of this composite mass with respect to z' axis.   **(12)**

3. (a) For the truss shown in Fig. 5, find the force in the members ac, cd, cf, gf and hi   **(13)**

    (b) Calculate the moment of inertia of the shaded area as shown in Fig. 6 about the line = y = 8 inch.   **(10)**

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Contd ... Q. No. 3

(c) A table supports a load of 200 N at point D as shown in Fig. 7. The weight of the triangular top is 350 N. Find the values of the reactions at the supporting legs A, B and C. The length of each side of the table is 1200 mm. **(12)**

4. (a) A 600 N cylinder is suppoted by the frame BCD as shown in Fig. 8. The frame is hinged at D. Determine the reactions at A, B, C and D. Assume all the surfaces to be smooth and also neglect the weight of frame BCD. **(11)**

(b) Using direct intergration, determine the co-ordinates of the centroid of the area bounded by the parabola $x^2 = 8y$ and the straight line $y = 2x$. **(12)**

(c) Two cables AC and BC terminate on a pole and exert forces in a horizontal plane x'y' at C as shown in Fig. 9. The tesion in the cables AC and BC are 6000 lb and 5000 lb rerspectively. The guy cable makes an angle of 50° with the pole. Calculate the value of the angle θ, tension in the cable CD and force in the pole CE. **(12)**

SECTION – B

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

5. (a) In Fig. 10, the solid cylinder A weighs 644 lb. The weight of B is 193.2 lb and the pulley C has negligible weight and friction. Determine the velocity of the c.g. of A after 10 seconds and the tension in the cord. The system starts from rest. Use the principle of work and kinetic anergy. **(12)**

(b) In Fig. 11, $W_A = 1000$ lb, $f_A = \frac{1}{3}$. The pulleys C and D are frictionless and weightless. A moves 60 ft from rest up the incline in 12 seconds. Determine the forces in the cables attached to A and B. **(11)**

(c) A ladder of length 6 m and weight 300 N is placed against a vertical wall as shown in Fig. 12. The coefficient of static friction between the wall and the ladder is 0.3 and that between the floor and the ladder is 0.2. The ladder also supports a man weighing 750 N. Determine the minimum horizontal force P to be applied at the bottom of the ladder to prevent slipping of the ladder. **(12)**

6. (a) The body A , shown in Fig. 13, is a solid homogeneous sphere with a weightless cord wrapped about its midsection. One end of the cord is attached to a fixed surface at B. If the cylinder is released from rest in the position shown and moves vertically downward, what is the speed of its c.g. after a displacement of 15 ft? The axis of rotaion of A remains in a horizontal positon. Use the principle of impuls and momentum. **(12)**

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Contd ... Q. No. 6

(b) The weight of the bar AB in Fig. 14 is W = 100 lb. If the reaction at B is 10 lb downward and $f_k = 0.2$, find $\bar{a}$ and Q considering REF. Neglect the size and weight of the block A and of the wheel B.　　**(12)**

(c) A simply supported overhanging beam is shown in Fig. 15. Calculate the reactions at the supports A and B.　　**(11)**

7. (a) A 4 ft cylinder (Fig. 16) has a central 2 ft grove about which is wound a weightless inextensible cord. $W_A = 500$ lb, $\bar{k}_A = 1$ ft and $W_B = 300$ lb. If the system is released, in what direction does motion occur? Also determine the tension in the cord after B moves 15 ft from rest. The friction force is sufficient to cause the cylinder to roll. Use the principle of impulse and momentum.　　**(14)**

(b) A point P moves on a path that can be represented by the euation $\dfrac{x^2}{36} - \dfrac{y^2}{16} = 1$. The x component of the velocity is constant at $v_x = 9$ m/s. At the instant when P is at the position $(12, 4\sqrt{3})$ what is the tangential velocity?　　**(10)**

(c) Derive an expression for the moment of inertia of a right circular homogeneous cone about an axis through its apex and parallel to the plane of the base.　　**(11)**

8. (a) Two weights A and B are supported by a pulley system as shown in Fig. 17. $W_A = 120$ lb and $W_B = 80$ lb. Consider the cord and pulleys as weightless and neglect friction. Determine the acceleration of A using principles of work and kinetic anergy.　　**(12)**

(b) Bodies A and B weighing respectively 50 lb and 75 lb are connected by a cord and rest on smooth inclined planes as shown in Fig. 18. What is the angle θ, if the bodies are in equilibrium? Use virtual work method.　　**(12)**

(c) Determine the x and y coordinates of the centroid of the shaded area shown in Fig. 19.　　**(11)**
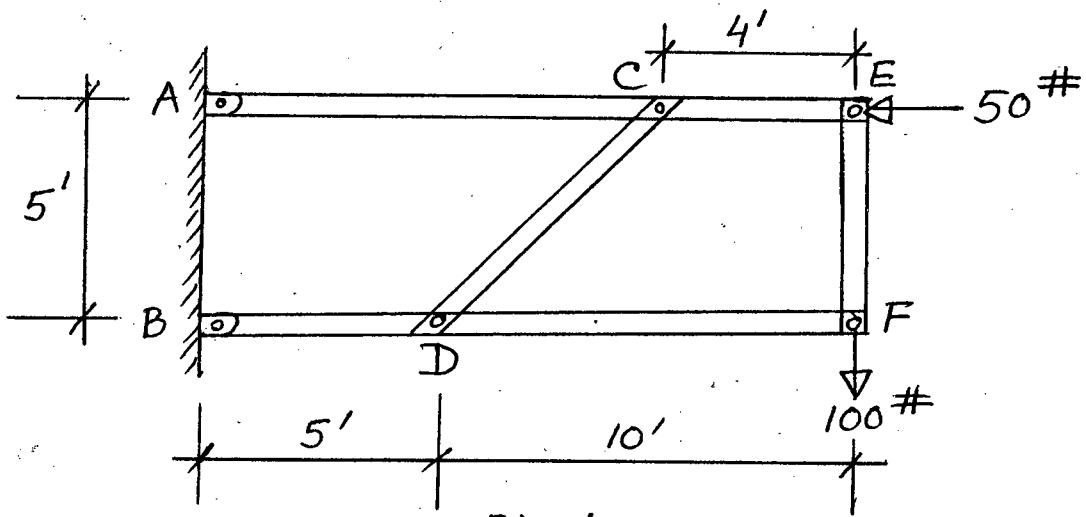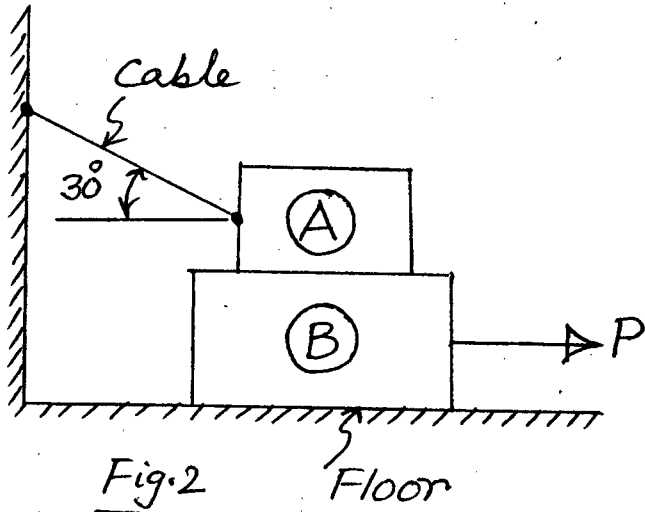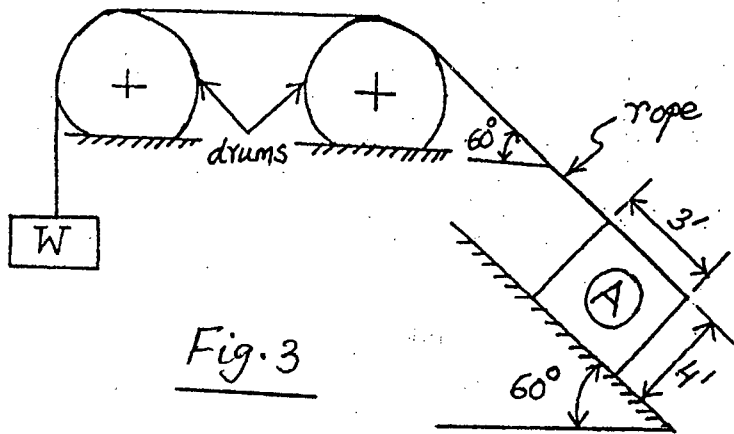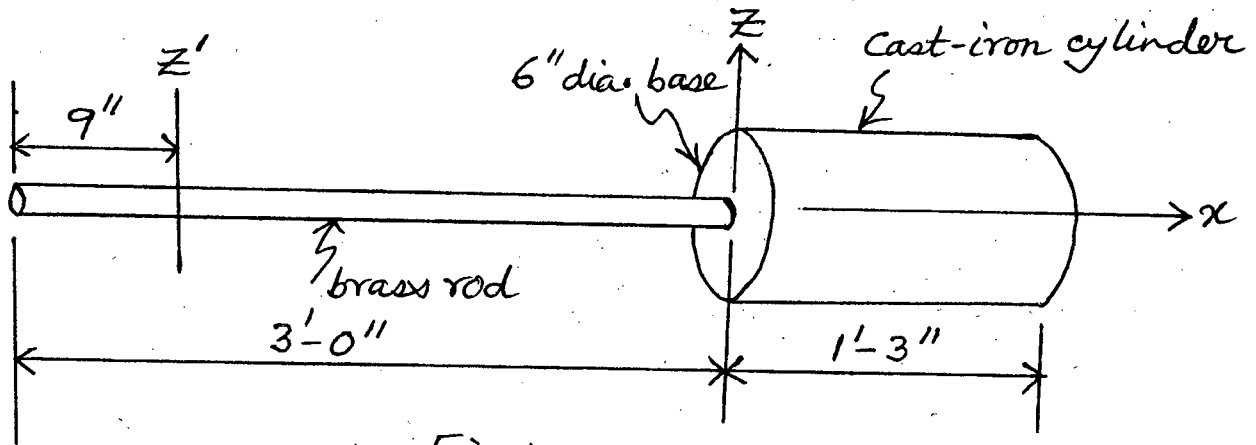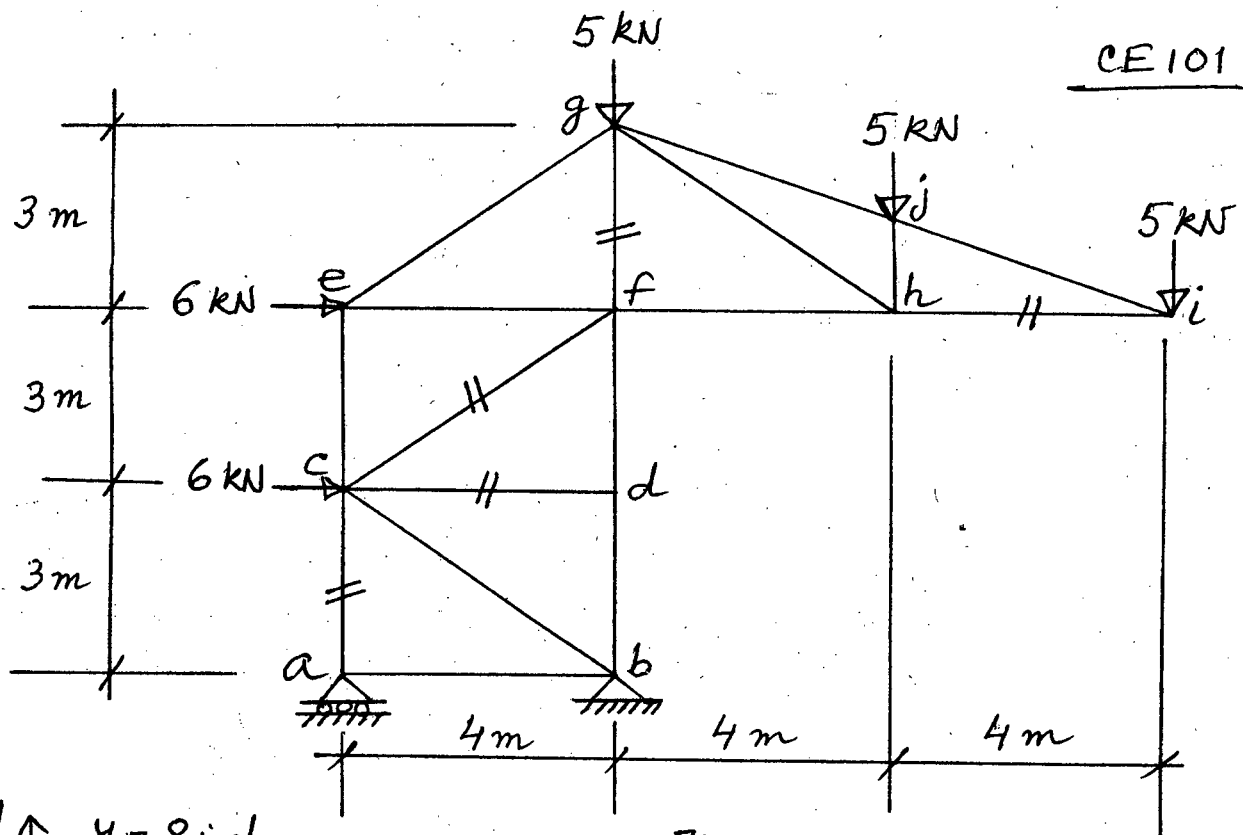

Fig. 1

Fig. 2

Fig. 3

Fig. 4

= 4 =

5 kN

5 kN

5 kN

3 m

6 kN

3 m

6 kN

3 m

g   e   f   h   i   j   c   d   a   b

4m   4m   4m

Fig. 5

y

$y = 8\ inch$

$y^2 = 16x$

x

Fig. 6

350 mm

500 mm

C   D   B   A

Fig. 7

D

75 mm

600 mm

200 mm dia.
cylinder

C   A   B

Fig. 8

y'

B $30°$ c   A x'

x' y' $50°$

y guy cable   Pole

x θ E x

D y

Fig. 9

= 5 =

Cord

Solid
cylinder

A

4'

2'

c

B

30°

Fig.10

D

A

f_A

30°

C

B

Fig.11

750 N

30°

Wall

5 m

Ladder

P
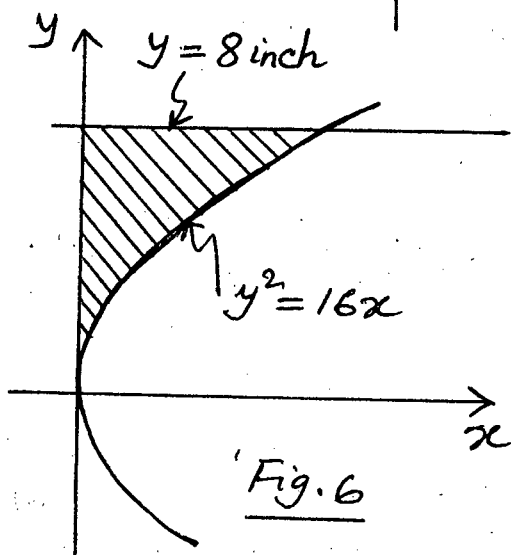
Floor

Fig.12

B

Fig.13

A

B

Fig.14

1.5'

1.5'

Q

A

W

f_k

2'

2'

= 6 =
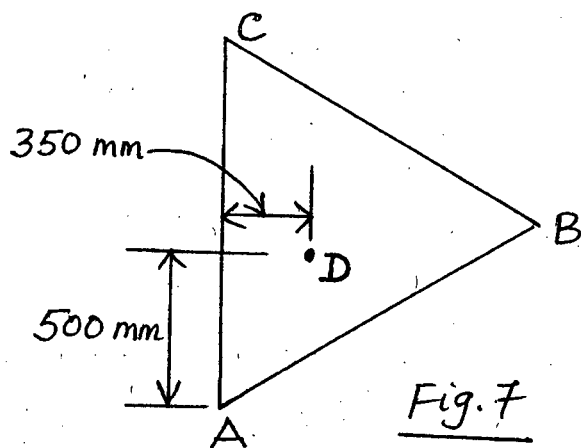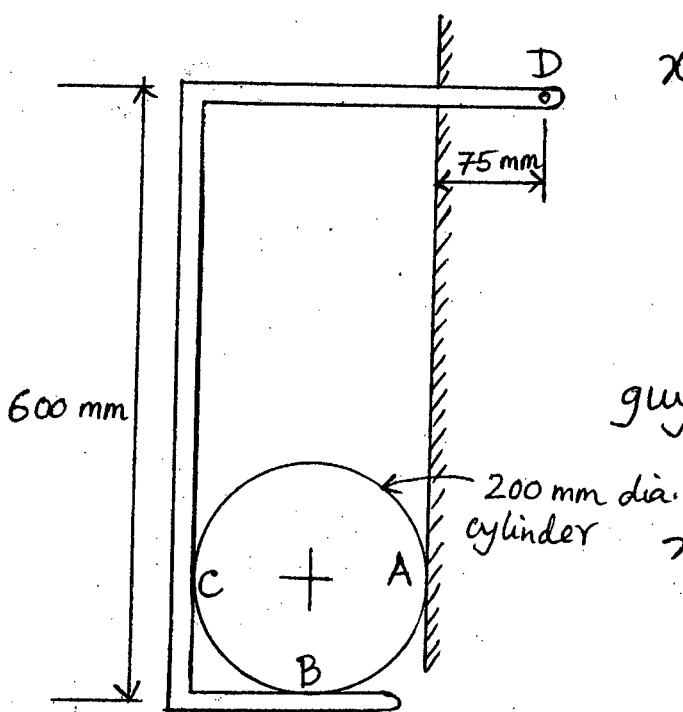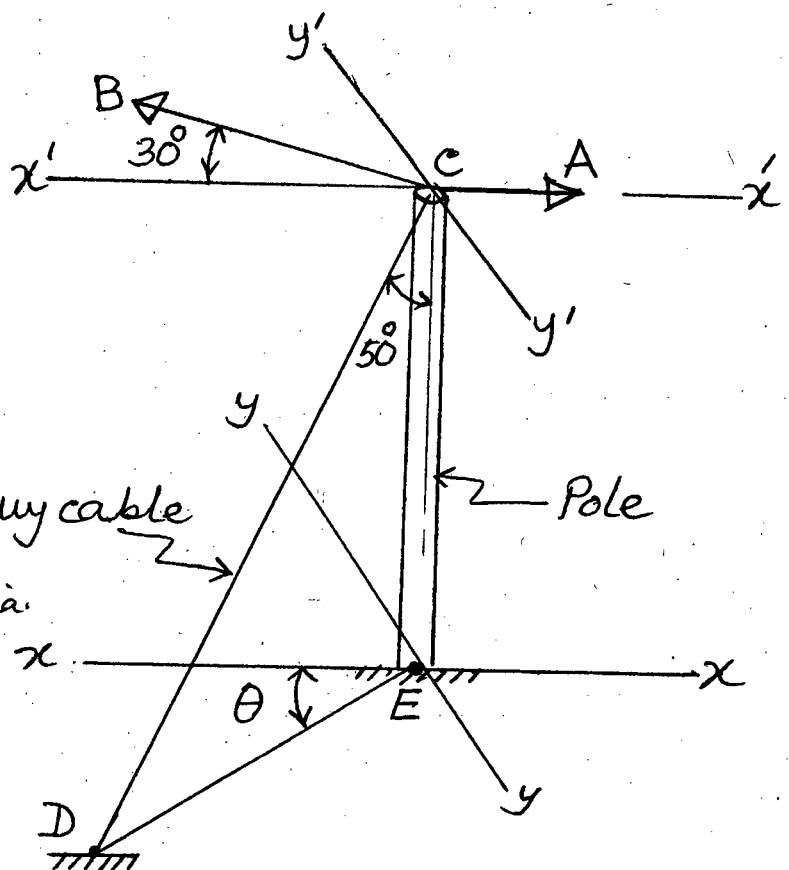
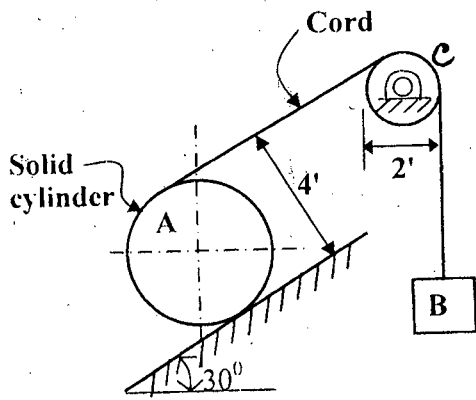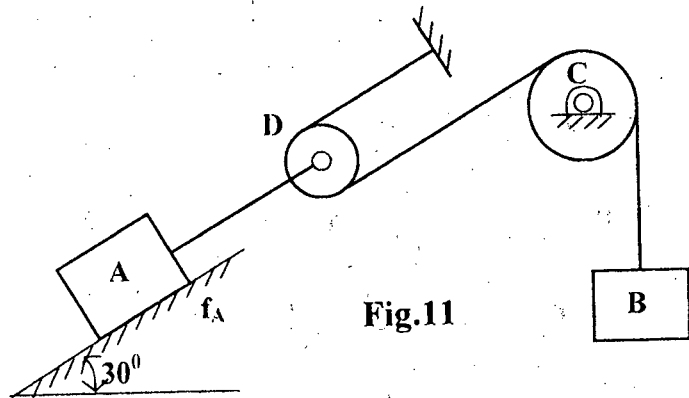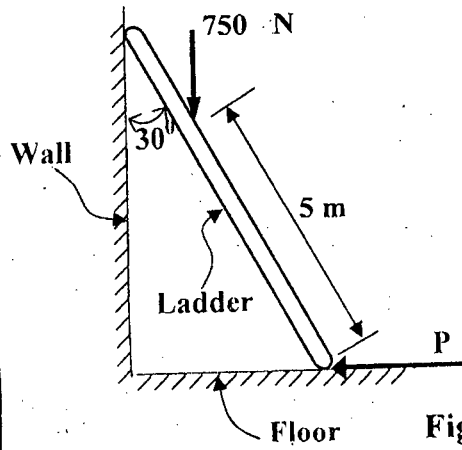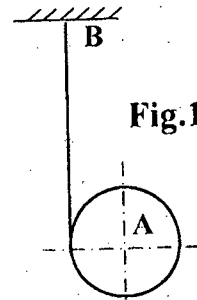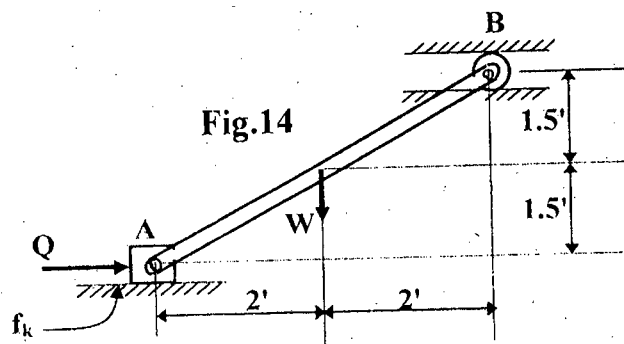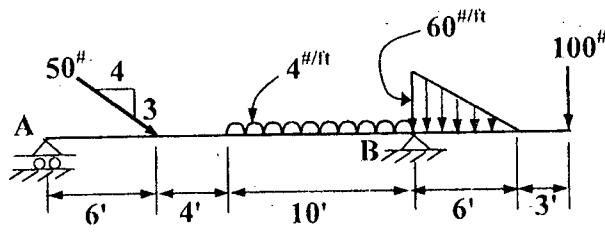Fig.15

Fig.16

Fig.17

Fig.18

Fig.19

= 7 =
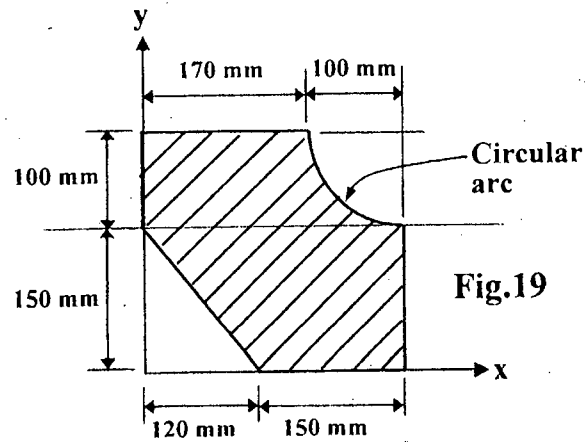
BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1   B. Sc. Engineering Examinations 2012-2013

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) What do you understand by permanent hardness of water? Write the cause of permanent non-alkaline hardness of water.   **(8)**

    (b) Describe with suitable reactions in the clark and lime-soda process of removal of hardness of water.   **(12)**

    (c) Write the reactions involved in the experimental determination of dissolved oxygen. Describe the method with calculation.   **(8)**

    (d) Describe the process of preparation of deionized water.   **(7)**

2. (a) Define colloid and distinguish between colloidal solution and colloidal mixture.   **(6)**

    (b) How would you prepare the colloidal system of the following?   **(4 x3=12)**
        (i) gold (ii) arseneous sulphide and (iii) ferric hydroxide

    (c) Describe the electrical and optical properties of colloidal system.   **(10)**

    (d) Write a note on purification of colloidal solution.   **(7)**

3. (a) Define effective nuclear charge. How effective nuclear charge changes from Li to Ne in the second period?   **(3+4=7)**

    (b) How are the elements in periodic table classified? Briefly discuss each class.   **(8)**

    (c) Define Portland cement and write the general composition of Portland cement.   **(8)**

    (b) With the help of a diagram describe the operational processes of a rotary kiln used for manufacturing cement clinker.   **(12)**

4. (a) What are the main assumptions of Bohr's theory? According to this calculate the wave lengths of the four lines in visible region of hydrogen spectra due to the transition of electrons. Show the appropriate energy levels of each transitions.   **(6+4+4=14)**

    (b) "It is not appropriate to imagine that electron circulating round the nucleus in a well defined orbit" – How can you justify the statement from your concept of atomic structure?   **(8)**

    (c) What is the physical significance of wave function (φ) in Schrödinger wave equation?   **(5)**

    (d) Calculate the wavelength of the particle in the following cases: **(8)**
        (i) a ball moving at a velocity of 45 m/s having mass of 5.5×10^{-2} kg
        (ii) an electron travelling at 45 m/s having mass of 9.11×10^{-31} kg.
    Comment on your result about the wave particle duality.

CHEM 103

SECTION – B

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

5. (a) What is meant by 'solvation'? Briefly describe the salvation process at the molecular level. Use solvation of a solid in a liquid as an example. **(3+12=15)**

(b) Define solubility quantitatively. Discuss the equilibrium concept of solubility. How temperature influences the solubility of a gas in liquid? **(3+12=15)**

(c) A soft drink is carbonated with CO_2 at 5.50 atm. What is the solubility of CO_2 in water at this pressure? (Given that solubility of CO_2 in water at 20 °C and 1.0 atm is 0.161 g/100 mL). **(5)**

6. (a) How is vapour pressure lowering related to rise in boiling point of a solution? Describe how you would use elevation of boiling point measurement to determine the molar mass of a compound. **(3+12=15)**

(b) What is 'reverse osmosis'? Briefly discuss how the concept of reverse osmosis can be utilized for water purification. Formulate Van't Hoff's equation for a non-ideal solution relating osmotic pressure and molar mass of a solute. **(3+12=15)**

(c) The average osmotic pressure of sea water is 30.0 atm at 25 °C. Calculate the molar concentration of an aqueous solution of sucrose that is isotonic with seawater. **(5)**

7. (a) Define lattice energy. Explain how the lattice energy of an ionic compound, LiF, can be determined using Born-Haber cycle? **(3+12=15)**

(b) According to molecular orbital theory, how sigma and pi bonding and antibonding molecular orbitals are formed from the interaction between atomic p-orbitals? Draw the molecular orbital diagram of CO^{2+} and write down the molecular electronic configuration. **(7+8=15)**

(c) Determine the hybridized state of the central atom in PF_3 molecule. Describe the hybridization process and find the molecular geometry. **(5)**

8. (a) What is 'steam distillation' (SD)? Based on the principle of SD, design apparatus and describe how octane can be purified using SD technique. **(3+12=15)**

(b) State and explain ionization energy. First ionization energy of nitrogen (1400 kJ/mol) is higher than that of oxygen (1314 kJ/mol) – explain. How the quantum numbers are necessary to address an electron? **(3+6+6=15)**

(c) Calculate the change in internal energy when 2 moles of CO (g) are converted to 2 moles of CO_2 (g) at 1 atm and 25 °C yielding $\Delta H = -566.0$ kJ/mol. **(5)**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1   B. Sc. Engineering Examinations 2012-2013

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

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) Sketch the graph of the function $f(x) = \begin{cases} 1-x^2 & \text{for } x < 0 \\ 1 & \text{for } 0 \le x < 1 \\ \dfrac{1}{x} & \text{for } x \ge 1 \end{cases}$ **(22)**

   Discuss the continuity and differentiability of f(x) at x = 0 and at x = 1.

   (b) Show that the L'Hôpital's rule fails to evaluate $\lim\limits_{x \to \infty} \dfrac{x}{\left(x^2 + 1\right)^{1/2}}$. Calculate the actual

   value of the limit.   **(13)**

2. (a) If $x = \sin\left(\dfrac{1}{a}\log y\right)$ then prove that $\left(1 - x^2\right)y_{n+2} - (2n + 1)xy_{n+1} - \left(n^2 + a^2\right)y_n = 0$

   and hence find the value of y_n when x = 0.   **(17)**

   (b) If u = u(x, y) and x = r cosθ, y = r sinθ then show that   **(18)**

   $$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = \frac{\partial^2 u}{\partial r^2} + \frac{1}{r}\frac{\partial u}{\partial r} + \frac{1}{r^2}\frac{\partial^2 u}{\partial \theta^2}.$$

3. (a) (i) Write down and explain the Rolle's Theorem.   **(13)**

   (ii) Verify that the hypotheses of Rolle's theorem are satisfied for the function

   $f(x) = x^3 - 3x^2 + 2x$ on the interval [0, 2], and find all values of c in that interval that

   satisfy the conclusion of the theorem.

   (b) Show that in the curve $by^2 = (x + a)^3$, the square of subtangent varies as the

   subnormal.   **(10)**

   (c) Show that the radius of the right circular cylinder of greatest curved surface, which

   can be inscribed in a given cone is half that of the base of the cone.   **(12)**

MATH 137

4. Work out the following integrals:

(i) $\int \dfrac{dx}{(2x+3)\sqrt{x^2+3x+2}}$ (12)

(ii) $\int \dfrac{dx}{\sqrt{2x^2+5x+3}}$ (12)

(iii) $\int e^x \dfrac{1-\sin x}{1-\cos x}\, dx$. (11)

SECTION – B

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

5. (a) Find a reduction formula for $I_{m,n} = \int \sin^m x \cos^n x\, dx$ and hence find (12)

$$\int \sin^4 x \cos^3 x\, dx.$$

(b) Evaluate: $\displaystyle\int_0^1 \cot^{-1}\left(1-x+x^2\right)dx$. (13)

(c) Evaluate: (10)

$$\lim_{n\to\infty}\left[\left(2+\frac{1}{n^2}\right)^{\!1/n^2}\left(2+\frac{2^2}{n^2}\right)^{\!2/n^2}\left(2+\frac{3^2}{n^2}\right)^{\!3/n^2}\cdots\left(2+\frac{n^2}{n^2}\right)^{\!n/n^2}\right].$$

6. Evaluate the following:

(a) $\displaystyle\int_0^\pi x\sin^6 x \cos^4 x\, dx$ (12)

(b) $\displaystyle\int_0^1 x^{n-1}\left[\log_e\left(\frac{1}{x}\right)\right]^{m-1} dx$ (11)

(c) $\displaystyle\int_0^2 \int_0^{\frac{1}{3}\sqrt{4-x^2}} \int_{x^2+y^2}^{4-8y} dz\,dy\,dx$ (12)

7. (a) Find the inverse of the matrix (18)

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

by (i) adjoint method and

(ii) elementary row operation of matrices.

Then show that $AA^{-1} = I_3$.

MATH 137

Contd ... Q. No. 7

(b) Reduce the matrix   **(17)**

$$A = \begin{bmatrix} 2 & 7 & 3 & 5 \\ 1 & 2 & 3 & 4 \\ 3 & 8 & 1 & -2 \\ 4 & 13 & 1 & -1 \\ 5 & 15 & 4 & 3 \end{bmatrix}$$

to echelon form then to its canonical form and write down the rank and nullity.

8. (a) Test whether the vectors   **(17)**

        $u = (3, 2, -1, 1)$, $v = (1, 1, -1, 2)$

        $w = (1, 2, 0, -1)$ and $x = (4, 2, -3, 6)$

are linearly independent. If not, then find a relation among them.

(b) Find the eigen values and the corresponding eigen vectors of the matrix,   **(18)**

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

Is the matrix A diagonalizable? If so, write down a nonsingular matrix P that diagonalizes A and the corresponding diagonal matrix D.

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1 B. Sc. Engineering Examinations 2012-2013

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

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) Establish the differential equation of a damped harmonic oscillator and solve it to obtain an expression for the displacement of the oscillator. Discuss in detail the conditions under which the oscillation becomes over damped and critically damped. **(4+14+5=23)**

   (b) The angular frequency (ω') of a damped oscillator is half of the angular frequency of the undamped oscillator (ω) of the same system. The mass of the oscillator is 2 kg and force constant K = 200 N/m. (i) What is the damping coefficient (ρ)? (ii) Calculate the time when the energy of the oscillator drops to one half of its initial undamped value. (iii) Calculate the amplitude drop with respect to initial amplitude during the above time found in (ii). **(12)**

2. (a) What are Lissajous figures? Derive a general expression for the resultant vibration of a particle simultaneously acted upon by two perpendicular simple harmonic vibrations having the same time period but different amplitudes and phase angles. **(2+11=13)**

   (b) What do you mean by effective mass of a spring? Show that the effective mass of a spring is $\frac{1}{3}$ of its total mass and hence deduce an expression for the time period. **(2+13=15)**

   (c) A body of mass 5 kg is suspended by a spring, which stretches by 0.1 m when the body is attached. It is then displaced downward an additional 0.05 m and then released. Find the amplitude and time period of the oscillator. The mass of the spring = 0.5 kg. **(7)**

3. (a) What are reverberation and reverberation time? What are the accoustic requirements of a good auditorium? **(3+4=7)**

   (b) Write down the assumptions of Sabine. Obtain an expression for reverberation time. **(4+12=16)**

   (c) A room has dimensions $20 \times 9 \times 12$ m^3. The seating capacity of the room is 600. (i) Calculate the number of reflections made per second by the sound wave with the walls of the room (ii) Calculate the reverberation time when the hall is empty and when full of audience (iii) What is the total absorbing power of the room when it is full? **(12)**

   Velocity of sound = 350 m/sec

   absorbing power of a man with seat = 2.5 Sabin

   absorbing power of a seat = 0.1 Sabin

   absorption coefficient of the materials of the room = 0.1

PHY 101

4. (a) What are Fresnel's half period zones? Why are they called so? **(7)**

   (b) Write a short note on 'Double refraction'? **(10)**

   (c) Describe the construction and working of a Laurent's half shade polarimeter. **(18)**

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

5. (a) What is interference of light? Why is interference not possible using two independent sources of light? Which nature of light is shown by interference of light? **(7)**

   (b) Describe and explain the formation of Newton's rings in reflected light. Prove that in reflected light (i) diameters of dark rings are proportional to the square roots of natural numbers and (ii) diameters of bright rings are proportional to the square roots of odd numbers. **(20)**

   (c) The radius of the 10th dark ring in a Newton's ring system viewed normally by reflected light of wavelength 5900×10^{-8} cm is 4 mm. Calculate the radius of curvature of the lens and thickness of the air film. **(8)**

6. (a) What do you mean by diffraction of light? Distinguish between Fresnel and Fraunhofer classes of diffraction. **(7)**

   (b) What is a diffraction grating? Discuss the theory of a diffraction grating. Deduce an expression for the dispersive power of grating. **(20)**

   (c) A parallel beam of monochromatic light is allowed to incident normally on a plane grating having 1200 lines per cm, and a second order spectral line is observed to deviate through $30°$. Calculate the wavelength of the spectral line. **(8)**

7. (a) State and explain the law of equipartition of energy. **(10)**

   (b) Deduce an expression for the energy distribution of gas molecules according to Maxwell's law of distribution of speeds. Also discuss the temperature dependence of gas molecules with the help of this law. **(20)**

   (c) Calculate the value of critical co-efficient obtained from Van der Waal's equation for one mole of oxygen gas. **(5)**

   [Given, $T_c = -118.8\ °C$, $P_c = 49.7$ atm-pressure, $b = 24.806$ cc].

8. (a) State Carnot's theorem and third law of thermodynamics. **(10)**

   (b) According to the distribution of free paths of gaseous molecules, show that the survival equation is $N = N_0 e^{-\frac{x}{\lambda}}$, where the symbols have their usual meanings. **(15)**

   (c) At what temperature, pressure remaining constant, will the R.M.S. velocity of a gas molecules be half of its initial value at 0°C? **(10)**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA
L-1/T-1 B. Sc. Engineering Examinations 2011-2012
Sub : HUM 375 (Government)

Full Marks: 140   Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION
The figures in the margin indicate full marks.

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

1. (a) What is meant by internationalism? Examine the increasing factors of internationalism. $(11\frac{1}{3})$

   (b) Discuss various types of constitution with examples. **(12)**

2. (a) Briefly describe the duties of a citizen in a state. $(11\frac{1}{3})$

   (b) Analyze the functions of Legislature in a state. **(12)**

3. (a) Discuss the role of opposition party in parliamentary form of government. $(11\frac{1}{3})$

   (b) What is good governance? Explain the elements of good governance. **(12)**

4. (a) Describe the strengths and weaknesses of democracy. $(11\frac{1}{3})$

   (b) Analyze the characteristics of Max Weber's 'Ideal Type of Bureaucracy'. **(12)**

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

5. (a) Define public policy. Review different approaches to the study of public policy. $(11\frac{1}{3})$

   (b) What is United Nations Organization? Discuss the principal organs of United Nations Organization. **(12)**

6. (a) Explain the salient features of the constitution of Bangladesh. $(11\frac{1}{3})$

   (b) What is socialism? Review the principles of Marxsim. **(12)**

7. (a) Discuss the importance of the language movement of 1952. $(11\frac{1}{3})$

   (b) Explain the major determinants of the foreign policy of Bangladesh. **(12)**

8. (a) What is e-government? Discuss the importance of e-government in Bangladesh. $(11\frac{1}{3})$

   (b) What is Non-Government Organizations (NGO)? Critically analyse the functions of NGOs in Bangladesh. **(12)**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1   B. Sc. Engineering Examinations 2011-2012

Sub : HUM 355 (Sociology)

Full Marks: 140   Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

SECTION – A

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

1. (a) What is sociological imagination? Explain the significant roles of sociological imagination for understanding human relationships.   **(10)**

   (b) Make a comparison between functionalism and conflict perspective of sociology.   **(13⅓)**

2. (a) Define social values. Does cultural lag resist social change? Show arguments in favour of your answer.   **(8⅓)**

   (b) Explain the following concepts with suitable examples: **(15)**

   (i) Subculture

   (ii) Counter culture

   (iii) Cultural relativism

   (iv) Ethnocentrism

   (v) Dominant ideology.

3. (a) How does socialization shape human behaviour? Critically evaluate the Roles of family and peer group as the agents of socialization.   **(10)**

   (b) What do you understand by socialization? Illustrate Charles Horton Cooley's looking-glass self theory.   **(13⅓)**

4. Write short notes on any three of the following: **(23⅓)**

   (a) System of social stratification

   (b) Types of socialization

   (c) Social mobility

   (d) Functionalist view of mass media.

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SECTION – B

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

5. (a) What do you understand by urbanization, urbanism and over urbanization? **(6)**

   (b) Write down the classification of cities with example. **(7⅓)**

   (c) What forces have led to the development of town, city, metropolitan, and finally megacities? **(10)**

6. (a) What do you mean by ecology, environment and pollution? How can environmental destruction be brought under control? **(13⅓)**

   (b) Briefly discuss how the socio-economic development depends on physical environment. **(10)**

7. (a) What do you mean by crude birth-rate and crude death rate? **(4)**

   (b) Write down the important characteristics of capitalism. **(10)**

   (c) Describe the stages of demographic transition theory. **(9⅓)**

8. Write short notes on any <u>Three</u> of the following: **(23⅓)**

   (a) Sources of social change

   (b) Consequences of industrial revolution

   (c) Potential consequences of global warming

   (d) Nature of work.