Sub. Code: 3021

National Academy of Science and Technology

NAST Secondary School

Dhangadhi, Kailali

First-Terminal Examination–2082

Subject: - Chemistry

Grade: XII **F.M.:75**

Time: 3 hrs.

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt **All** the questions:

Group - A

Rewrite the correct option in your answer sheet (11 x 1=11)

1 Which of the following reagents can be used to distinguish between phenol and picric acid
a. KOH b. Na c. NaOH d. $NaHCO_3$

2 How much water should be evaporated from 400 ml of N/10 HCl to make it exactly 2N?
a. 360 ml b. 370 ml c. 380 ml d. 390 ml

3 The reaction between a primary amine, chloroform and a few drops of alcoholic KOH is known as
a. Elimination reaction b. Carbylamine reaction
c. William sons synthesis d. Decarboxylation reaction

4 The chemical compound formed by the reaction of benzene with chlorine and $FeCl_3$ in dark condition is
a. chlorobenzene b. hexachlorobenzene
c. DDT d. Gammexane

5 Which of following is most acidic?
a. CH_3OH b. CH_3CH_2OH c. $(CH_3)_2CHOH$ d. $(CH_3)_3COH$

6 How many mole of H_2SO_4 are required to neutralize 4 litre of 2N NaOH solutions?
a. 2 mole b.1mole c. 4 mole d. 3.1 mole

7 The reaction of phenol with chloroform and aq.NaOH at 70°C, the electrophile involved is
a. $CHCl_2$ b. CCl_3 c. CCl_2 d. $CHCl_3$

8 What is the molarity of 8 gram NaOH dissolved in 1000 ml of solution
a. 0.4M b. 0.6M c. 0.2 M d. 2M

9 Which of the following ionic species will impart colour to an aqueous solution?
a. Ti^{+4} b. Cr^{+3} c. Cu^{+1} d. Zn^{+2}

10 Best example of surface catalyst is
a. Pd b. MnO_2 c. V_2O_5 d. $TiCl_3$

11 The following chemical reaction represents

$$CH_3CH_2\text{-}OH + SOCl_2 \xrightarrow{Pyridine} CH_3CH_2Cl + HCl + SO_2$$

a. Sandmeyer's reaction b. Darzen's reaction
c. Kolbe's reaction d. Etard's reaction

Group B:

Short Answer Question **(8×5=40)**

12 a) A primary alkyl halide 'A' if allowed to react with KCN yields a compound B, Which on acidic hydrolysis gives propanoic acid .Identify A and B with IUPAC names. (3)
b) Suggest any two test for ethanol in laboratory (2)

Or

An organic compounds 'A' when heated with sodium in presence of dry ether gives 'B'. 'B' reacts with limited bromine in presence of sunlight gives 'C'. 'C' on heating with aqueous KOH gives 'D'.'D' gives 'E', when distilled with $CaOCl_2$ and water. 'E' produces a poisonous gas when exposed to air and light. Identify A, B, C, D and E. Write the reactions involved. **5**

13. a) What is SN^1 reaction? show the mechanism of tert- butyl bromide with aqueous NaOH. **3**
b) Why is nucleophilic substitution reaction of haloarenes difficult than haloalkanes? **2**

14. Both alcohol and phenol are acidic in nature. But, alcohols are weaker than phenol **5**
a. Explain why phenols are more acidic than alcohols?
b.How is the presence of phenolic functional groups in an organic compound detected?
c. Why do phenols undergo electrophilic substitution at ortho and propositions? Give an example of electrophilic substitution in phenol? **(1+1+2+1)**

15. What happens when
    a. Phenol reacts with ethanoyl chloride
    b. Phenol is couple with benzene diazonium chloride
    c. Phenol is treated with $FeCl_3$
    d. Convert Phenol into meta bromo benzoic acid **(1+1+1+2)**

16. Write an example of primary, secondary and tertiary alcohol of $C_4H_{10}O$ with their IUPAC name. How would you separate them by Victor Meyer's method? **1+4**

Or

How can you obtain ethanol by fermentation process **5**

17 Anisole is an aromatic ether with a smell of anise seed. Many of its derivatives are found in natural and artificial fragrances
    a. How would you obtain anisole (methoxybenzene) from phenol?
    b. Convert ethoxyethane to methoxy ethane and vice versa
    c. Explain why phenyl methyl ether reacts with hydrogen iodide to give phenol and methyl iodide, and not iodo benzene and methyl alcohol. **(1+2+2)**

18. Write the structure of organic compound A, B, C, D and E with their name in the following sequence of reaction

$$A \xrightarrow[\Delta]{PBr_3} B \xrightarrow[]{KCN} C \xrightarrow[\Delta]{H_2O/H^+} D \xrightarrow[\Delta]{P_2O_5} E$$

Compound A is a primary alcohol that gives a positive iodoform test. **(5)**

19. Define Molarity. 2.014 grams of a chalk were dissolved in 50 ml of normal HCl solution. The unreacted acid is then titrated with 0.8N NaOH solution, 12.7 ml being required. Find the percentage of $CaCO_3$ in chalk. **(1+4)**

Group- C

Long Answer question **(3×8=24)**

20 a) Equivalence point and end point are two commonly used terms in titration.
    a. Distinguish between end point and equivalence point.
    b. What is meant by titration error and how can it be minimized?
    c. Concentrated nitric acid used in laboratory is usually 69% (w/w)and has a density of 1.41 gcm^{-3} Calculate its normality. What volume of this solution contains 23 g of nitric acid? **[2+2+4]**

Or

Titration curves are the basis for the selection of proper indicators in acid base titrations
    a. What are titration/pH curves? How the selection of suitable indicators is made in acid base titrations? Expalin.
    b. Why do titration curves show a sharp change of pH at the end point?
    c. What are normality factor, titrant and titrand. **(1+4+1+2)**

21 a) A monohydric alcobol $P(C_4H_{10}O)$ on oxidation with acidic $KMnO_4$ gives carboxylic acid $Q(C_4H_{10}O_2)$.On dehydration of P with hot and conc. H_2SO_4 yields compound R. On treatment of R with warm aqueous H_2SO_4 produces $S(C_4H_{10}O)$,an isomer of alcohol P. Compound S is resistance to oxidation. Identify P, Q, R and S with proper reactions.**(5)**

    b) Suggest the reagent I and II

$$\text{1-chloroprorpane} \xrightarrow{I} \text{Propylene} \xrightarrow{II} \text{Propan-2-ol}$$ **(3)**

22. Write an example of the following reactions. **(1×8=8)**
    i) Coupling reaction
    ii) Kolbe's reaction
    iii) Sandmeyer reaction.
    iv) Wurtz-Fittig reaction
    iv) Riemer Tiemann reaction
    vi) Hydroboration oxidation reaction
    vii) Rasching's process
    viii) Oxo process

Best of luck

Sub.Code:0081

National Academy of Science and Technology

NAST Secondary School

Dhangadhi, kailali

First terminal Examination-2082

Subject: Mathematics

Grade: XII (Science) **F.M=75**

Time: 3hrs

Candidates are required to give the answer in their own words as far as practicable.
The figure in the margin indicate the full marks.

Attempt **ALL the** questions

Group "A"

Rewrite the correct option in your answer sheet. **(1x11=11)**

1. How many words can be formed from the letters of the word **'KAILALI'** ?

   a) 7! b) $\frac{7!}{2!2!2!}$ c) $\frac{9!}{2}$ d) $\frac{7!}{(2!)^2}$

2. If $C(43, r-6) = C(43, 3r+1)$, *then the value of* r *is*

   a) 12 b) 8 c) 10 d) 14

3. The value of $(1+i)^8 + (1-i)^8$ is equal to

   a) 32 b) 64 c) 128 d) 256

4. The value of $\frac{a+b\omega+c\omega^2}{a\omega+b\omega^2+c}$ equals to

   a) 1 *b)* ω *c)* ω^2 *d)* 0

5. If $\sum n = 55$ *then* $\sum n^3 = ?$

   a) 110 b) 165 c) 385 d) 3025

6. The middle term of $\left(x+\frac{1}{x}\right)^{10}$ is

   a) $C(10,6)$ *b)* $C(10,5)$ *c)* $C(10,4)$ *d)* $P(10,5)$

7. The coefficient of x^5 in the expansion of $\left(x+\frac{1}{2x}\right)^7$ is

   a) $\frac{2}{7}$ *b)* $\frac{7}{2}$ *c)* 14 *d)* $\frac{7}{3}$

8. The system of equations $2x + y = 7$ *and* $x + 3y = 11$ *is*

   a) consistent and independent *b) inconsistent and independen*
   c) *consistent and dependent* d) *inconsistent and dependent*

9. The system of equation cannot be solved by Cramer's rule if

a) $D = 0$ b) $D_x = 0$ c) $D_y = 0$ d) $D_z = 0$

10. The number of terms the expansion of $(1 + 2x + x^2)^6$ is

a) 11 b) 12 c) 13 d) 14

11. The amplitude of the complex number $1 + \sqrt{3}i$ is

a) $\frac{\pi}{3}$ b) $\frac{2\pi}{3}$ c) $\frac{4\pi}{3}$ d) $\frac{5\pi}{3}$

Group "B" **(5x8=40)**

12. **a)** State multiplication principle of counting. Using this principle, find how many numbers of two different digits can be formed from the integers 0, 1, 2, 3, 4, 5, 6, 7, 8 & 9? **(1+2)**

b) If (n+2)! $= 210(n-1)!$ *then find* n **(2)**

13. Write a relation between Permutation & Combination.

From 6 gentlemen & 4 Ladies a committee of 5 is to be formed. In how many ways can this be done so as to include at least 3 ladies? **(1+4)**

14. State binomial theorem for n$\in \mathbb{Z}^+$.

If $(1+x)^n = C_0 + C_1x + C_2x^2 + C_3x^3 + \cdots + C_nx^n$, *Prove that*

$C_0C_n + C_1C_{n-1} + \cdots + C_nC_0 = \frac{2n!}{n!n!}$ **(1+4)**

15. Show that **(5)**

$$\frac{1}{1!} + \frac{1+3}{2!} + \frac{1+3+5}{3!} + \frac{1+3+5+7}{4!} + \cdots . = 2e$$

16. Given a series as

1+(3+5)+(7+9+11)+... ...

a) Find the n^{th} term

b) Find the sum of first n terms. **(2+3)**

17. State De-Moivre's theorem. Using this theorem, solve $z^3 = 1$ **(1+4)**

18. State principle of Mathematical induction. Using it, prove that

$$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \cdots + \frac{1}{n(n+1)} = \frac{n}{(n+1)}$$ **(1+4)**

19. **a)** What is circular permutation? How it is differ from linear permutation? Justify with example **(3)**

b) If $y = x + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \cdots$, then express x *in terms of* y **(2)**

Group "C" (8x3=24)

20. a) Define logarithmic series. Prove that

$$\frac{1}{1.3}+\frac{1}{2.5}+\frac{1}{3.7}+\frac{1}{4.9}+\cdots . to\ \infty = 2-2\ln 2$$

(1+3)

b) State and prove any one property of Binomial coefficient. **(2)**

c). Expand $\frac{1}{\sqrt{1-x}}$ $(|x|<1)$ up to 4 terms. **(2)**

21. A manufacturing company produces three main types of product. Each product passes through three manufacturing stages with a separate labor force assigned to each stage. The table below shows the time that an item of each type requires for each stage in the manufacturing process and the total labour in man hours available for each stage

	Type A	Type B	Type C	Total labour available
Stage 1	5	7	8	695
Stage 2	3	4	7	510
Stage 3	2	3	4	320

a) Express the above information in the form of equation **(2)**

b) How many number of item of each type must be produced in order to use completely the man hours of labour available at each stage of the production process? (Use any method). **(4)**

c) Find the total cost of items if the cost per unit of the item of Type A is Rs 100, Type B is Rs 150 & Type C is Rs200. **(2)**

22. Let $z_1 = r_1(\cos\theta_1 + i\sin\theta_2)$ & $z_2 = r_2(\cos\theta_2 + i\sin\theta_2)$ be two Complex numbers

a) Find $z_1 z_2$ **(3)**

b) Find $\frac{z_1}{z_2}$ **(3)**

c) What is argument of $z_1 z_2$? **(1)**

d) What is magnitude of $\frac{z_1}{z_2}$? **(1)**

Best of Luck

Sub.code:2011

National Academy of Science and Technology

NAST Secondary School

Dhangadhi, Kailali

First terminal examination-2082

Subject: - Biology

F.M.: 75

Grade: 12

Time: 3 Hrs.

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt **ALL** the questions

Section: I (Botany)

Group 'A'

Rewrite the correct option of each question in your answer sheet. 5x1=5

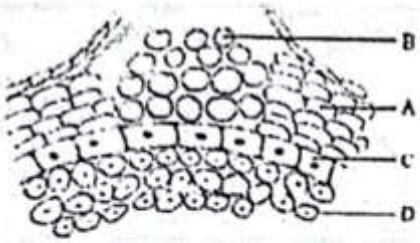
1. Which of the following meristem helps in increasing the girth of the plant?
   a) Primary meristem b) Apical meristem
   c) Intercalary meristem d) Lateral meristem
2. **Vessels are the major water conducting cell in ;**
   a)Monocots only b) Dicots only
   c) Angiosperm d) Gymnosperm
3. Suppose two cell **A** & **B** are in contact with one another but are separated by semi-permeable membrane. The osmotic pressure of cell **A** is 12atm and that of **B** is 15 atm. Similarly the turgor pressure of cell **A** is 6 atm and **B** is 10 atm. In which direction will the water move;
   a) From cell **A** to sell **B**
   b) From cell **B** to sell **A**
   c) There will no movement of water
   d) Water can move either from cell **A** to **B** or cell **B** to **A**.
4. Release of CO2 in photorespiration occur in;
   a) Chloroplast b) Mitochondria c) Perioxisome d) Ribosome
5. For fixation of one molecules of glucose in calvin cycle are required....
   a) 12 ATP and 12NADPH2 b) 12ATP and 18NADPH2
   c) 18ATP and 12NADPH2 d) 18ATP and 18NDPH2

Group "B"

Give short answer the following questions. **[4x6=16]**

6) Why is parenchyma called simple permanent tissue? Mention the characteristics features and function of parenchyma. [1+3]

7) Study the diagram and answer the following questions.



I. Name the parts of **A, B, C & D.** [2]

II. What is the function of part **C?** [1]

III. What is meant by periblem? [1]

8) Define osmosis. Describe its type and significances. **[4]**

9) Transpiration is important phenomenon in plants why? How transpiration is differ from guttation. **[1+3]**

Or

What are C3 plants? How it is differ from C4-plants. **[1+3]**

Group "C"

Give long answer the following questions. **[8x2=16]**

10) What is an ascent of sap? Describe different theories regarding ascent of sap. **[1+7]**

11) The light dependent reaction of photosynthesis involve a complex sequences of event that convert light energy into chemical energy. Explain the steps involved in this process, including the role of photosystems, electron transport chain and ATP synthase. **[4+4]**

OR

Why does the calvin cycle require six turns for the production of a single molecule of glucose? Describe the mechanism of the cycle that takes place during the production of glucose with necessary chart. **[1+7]**

Section: II (Zoology)

Group 'A'

Rewrite the correct option of each question in your answer sheet.6x1=6

1. The squamous epithelium found in
   a) Urinary bladder b) Blood vessels
   c) Trachea d) Heart
2. Which of the following is protein is found in muscular tissue
   a) Actin b) myosin c) Chondin d) both a and b
3. In frog coelom is formed by spliting of mesodermal layer ,such type of coelom is known as
   a) Schizocoelomate b) psedocoelomate
   c) haemocoelomate d) enterocoelomate
4. Which of following is Ectodermal in origin..
   a) Notochord b) nerve cord c) thyroid gland d) skin
5. The correct dental formula for adult human
   a) 2023 b) 1223 c) 2123 d) 2102
6. Which parts of small intestine possess numerous villi
   a) Ileum b) Duodenum c) Jejulum d) Both a and b

Group "B"

Give short answer the following questions. **[4x4=16]**

7. Explain about simple epithelial tissue. **4**

8. Discus oogenesis in brief **2+2**

OR

Difference between striated and unstrained muscles. **2+ 2**

9. Answer the following question on the basis of given figure

a) Identify A B and C 1.5
b) Mention the function of A and B 2
c) What is the number of WBC in human blood 0.5

10. Discuss about human large intestine in brief.4

Group 'C'

Give long answer the following questions **[2x8=16]**

11. What is neuron? Mention its basic proporties. Describe structure and type of neuron. **1+1+3+3**

OR

How clevage occur in frog .explain. Descibe notogenesis. **4+4**

12. Draw well laballed diagram of human alimentary canel. (no description required). Explain in detail about buccal cavity. **4+4**

Best of luck

Sub. Code: 1021

National Academy of Science and Technology

NAST Secondary School

Dhangadhi, Kailali

First-Terminal Examination–2082

Subject: - Physics

Grade: XII **F.M.:75**

Time: 3 hrs.

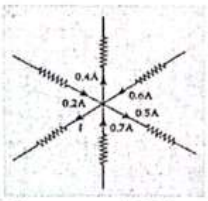
Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

GROUP-A

Multiple Choice Questions ***[11 X 1 =11]***

Attempt ALL Questions By Rewriting The Best Answer.

1) Which of the following quantity must be zero when angular momentum of a system is conserved?
   a) K.E b) Linear Momentum c) Torque d) Angular Momentum
2) The density of ice is 0.9 g/cc and that of sea water is 1.1 g/cc. An ice berg of volume V is floating in sea water, the fraction of iceberg above water level is:
   a) $\frac{1}{11}$ b) $\frac{2}{11}$ c) $\frac{3}{11}$ d) $\frac{4}{11}$
3) After terminal velocity is reached, the acceleration of a body falling through a fluid is:
   a) Equal to g b) Less than g c) Greater than g d)Zero
4) In which thermodynamic process maximum work done can be obtained?
   a) Isothermal b) Adiabatic c) Isochoric d) Isobaric
5) A liquid neither rise nor fall in a capillary tube. The angle of contact is ;
   a) 0^0 b) less than 90^0 c) greater than 90^0 d) 90^0
6) A particle starts SHM from the mean position. Its amplitude is A and time period is T. At certain time its speed is half of maximum speed. What is the displacement?
   a) $\frac{\sqrt{2}}{3}A$ b) $\frac{\sqrt{3}}{2}A$ c) $\frac{2}{\sqrt{3}}A$ d) $\sqrt{2}$ A
7) Bernoulli's theorem is based on conservation of :
   a) mass b) energy c) momentum d)charge
8) In given circuit, what is the value of I ?



   a) 0.2 A b) 0.5 A c) 0.6 A d) 0.7 A
9) A potentiometer wire of length 1m & resistance 4.9Ω is connected in series with 490 Ω resistance and 2V battery. Then, the potential gradient of the potentiometer wire is:
   a) 0.2 mV/cm b) 0.3 mV/cm c) 0.4 mV/cm d) 0.5 mV/cm
10) Which of the following combination would give maximum e.m.f. ?
   a) Ni & Cr b) Fe & Bi c) Cu & Fe d) Sb& Bi
11) For a simple pendulum, the graph between l and T^2 comes out to be
   a) Straight line b) Parabola c) Hyperbola d) Circular

GROUP-B

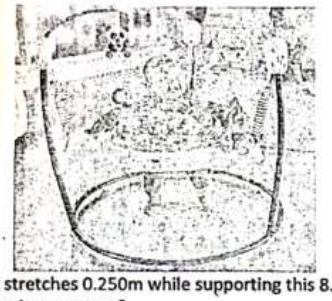
Short Answer Questions **[8X5 = 40]**

12) a) Define angular momentum and write its SI unit. **[1]**
   b) State & prove principle of conservation of angular momentum. **[2]**
   c) A disc of M.I. $5x10^{-4}$ Kgm^2 is rotating freely about the axis through its centre at 60 rpm. Calculate the new revolution per minute if some wax of mass 0.01 Kg dropped gently on the disc 0.06m from the axis. **[2]**

OR,

   a) Why Sb-Bi thermocouple preferred to Fe-Cu thermocouple? **[1]**
   b) How thermo emf varies with temperature? Explain with graph. **[2]**
   c) The thermo emf E of Fe-Cu thermocouple varies with the temperature β of hot junction (cold junction at 0^0C) as E= 14 β+ 0.02 β^2. Find β and inversion T. **[2]**

13) a) What is simple harmonic motion? Write its main features. **[2]**
   b) The device pictured in figure entertains infants while keeping them from wandering. The child bounces in a harness suspended by a spring.

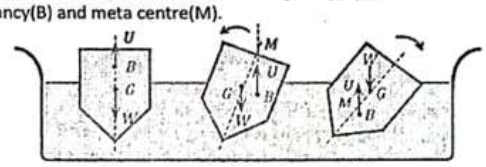


(i) If the spring stretches 0.250m while supporting this 8.0 Kg child, What is it's spring constant? [1]

(ii) What is the time frame for one complete bounce of this child? [1]

(iii) What is the child's maximum velocity, If the amplitude of his bounce is 0.200m. ($g = 9.8\ m/s^2$) [1]

14) The figure shows different conditions of equilibrium of a floating body with respect to the positions of centre of gravity(G), centre of buoyancy(B) and meta centre(M).



(A) (B) (C)

a) Define metacentre. [1]

b) Explain with reason the conditions for stable, neutral and unstable equilibrium of a floating body using the given figure. [3]

c) A dead body floats in water but living body sinks in water, why? [1]

15) a) Define surface tension. On what factors does it depend? [2]

b) Why does oil rises into the wick of a lamp? [1]

c) Calculate the work done in spraying a spherical drop of 1mm radius into a million droplets of equal size, surface tension of water being 0.072 N/m. [2]

OR,

a) Why are rain drops spherical in shape? [1]

b) Establish a relation between surface tension & Surface energy. [2]

c) A capillary tube of radius 0.5mm is dipped in water of surface tension 75 dyn/cm. To what height is the water raised by the capillary action above the normal level? [2]

16) a) State & explain Newton's formula of viscosity. [2]

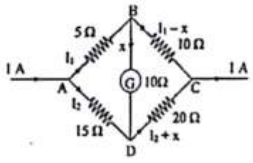
b) Write down the CGS and SI units of coefficient of viscosity. [1]

c) A metal plate of area $2.5X10^{-4}\ m^2$ is placed on a $0.25X10^{-3}$ m thick layer of caster oil at 20^0C. If a force of 2.5 N is needed to move the plate with a velocity $3X10^{-2}$ m/s; calculate the coefficient of viscosity of caster oil. [2]

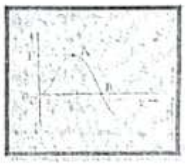
17) Wheatstone bridge circuit design is the best application of Kirchhoff's laws.

a)What are the two basic Kirchhoff's laws? Explain. [2]

b) Determine the current flowing through the galvanometer shown in the figure. [3]



18) In graph below:



a) Define the temperatures at points A & B called in thermoelectric effect? [2]

b) If value of A & B are 320K & 500K, What must be the value of θ_c? [1]

c) For emf $E=10\theta - \frac{3}{100}\theta^2$, what could be the emf at neutral temperature, as given in (b). [2]

19) a) What do you mean by shunt? [1]

b) How galvanometer can be converted into ammeter? Explain. [2]

c) Define current sensitivity of a galvanometer. How can you increase the current sensitivity of galvanometer? [1+1]

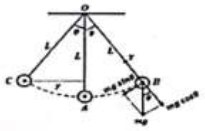
OR,

a) State Stoke's law of viscosity. [1]
b) Describe a method to determine terminal terminal velocity of a spherical body falling through a viscous liquid using Stoke's law in your physics lab. [3]
c) A falling hailstorm does not cause much damaged, why? [1]

GROUP-C

Long Answer Questions [3x8 = 24]

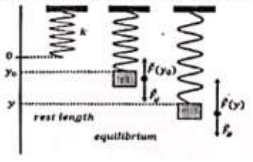
20) Figure shows a massive body suspended by a weightless string of length L. When the mass is displaced through the displacement of y and released, it will oscillate freely.



i. Which force is responsible for the oscillation? [1]
ii. Show that oscillation of this massive body is SHM and derive its time period. [3]
iii. If we perform this experiment inside water, what will happen to the motion? [2]
iv. How does the K.E., P.E. and Total energy of a simple harmonic oscillator vary with position? Explain with graph. [2]

OR,

Consider the vertical mass-spring system illustrated as shown in figure. Where 'k' is spring constant, 'y_0' is extension produced due to mass 'm' and 'y' is the displacement produced in the system due to external force. Find the time period of the system.



a) Prove that motion of this mass-spring system is SHM. Also find the time period & frequency oscillation. [3]
b) What happens to the time period if mass is doubled? [1]
c) Derive an expression for total energy of a particle executing SHM. [2]
d) On an average a human heart is focused to beat 85 times in a minute. Calculate its frequency & time period. [2]

21) a) How can you find the moment of inertia of a thin long uniform rod about an axis passing through itscentre& perpendicular to its plane. Also Find out the radius of gyration of rod. [3]
b) Calculate the M.I & radius of gyration of a rod of length 10 cm and mass 200gm about a perpendicular axis passing through its one end. [2]
c) Give the significance of moment of inertia. [1]
d) If our earth suddenly expands double of its radius, How would be the duration of day change? [2]

22) a)What is the principle of potentiometer? Using potentiometer, how can you measure internal resistance of a cell ? [1+2]
b) How is it superior than the voltmeter in the accurate measurement of emf? [1]
c) On what factors does the potential gradient of the potentiometer wire depend? [1]
d) A potentiometer wire of length 300cm has a resistance of 20Ω. It is connected in series with a resistance and a cell of emf 4V of neglisible internal resistance. A source of emf 20mV is balanced against a length of 60cm of the potentiometer wire. What is the value of external resistance? [3]

OR,

a) State & prove Bernoulli's theorem of a non-viscous fluid. [3]
b) Can you apply Bernoulli's theorem for water flowing in the river? Explain. [1]
c) During a severe storm roof tops are blown off, why? [1]
d) The flow speeds on the upper & lower surfaces of the wing of aeroplane are 70 m/s and 63 m/s respectively. What is the lift force of the wing if its area is 2.5 m^2? (Density of air is 1.30 kg/m^3) [3]

BEST OF LUCK !!!