B.Sc. Engineering 1st year 2nd Term Examination, 2017

Department of Electronics and Communication Engineering
Khulna University of Engineering & Technology

Ch 1209
(Chemistry)

TIME: 3 hours   FULL MARKS: 210

N.B. i) Answer **ANY THREE** questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.

SECTION A

(Answer **ANY THREE** questions from this section in Script A)

1. a) Distinguish between electronic and electrolytic conduction. (05)
    b) What do you mean by relaxation effect and electrophoretic effect? Write down the (10)
       Debye-Huckel-Onsager conductance equation for electrolyte solution and make a
       schematic plot of Λ VS $\sqrt{c}$ for NaCl and AsNO$_3$ solution.
    c) How can you explain the abnormal mobilites of H^+ and OH^- ion in solution? (10)
    d) With graph, explain the weak acid with strong base conductometric titration curve. (10)
       What are the advantages of conductometric titrations over ordinary titrations?

2. a) Draw an electromechanical cell of Galvanic type. Write down the sign convention (10)
       and types of reaction of electrolytic cell and Galvanic cell at anode and cathode.
    b) What is Quinhydrone electrode? How would you make this electrode for the (10)
       determination of pH of a solution?
    c) Draw a cell of lead acid battery. How does the battery develop voltage? Write down (10)
       the charge and discharge reaction of the battery.
    d) Calculate the emf of the Z_n-A_g cell at 298^0 K when $[Z_n^{2+}] = 0.2$ M and $[A_g^+]=2$ M, (05)
       given that E^0 of cell at 298^0 K is 1.56 V.

3. a) Define electromagnetic radiation. What are the sources of line spectra and band (10)
       spectra?
    b) Calculate the absorption maximum for the compound. (05)
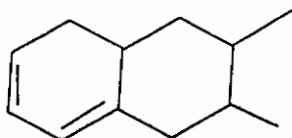
    c) How can the absorption laws be used for the estimation of analyses? What is the (10)
       limitation of the law?
    d) What do you mean by quantum yield of photochemical reaction? What are the causes (10)
       of high and low quantum yield?

4. a) What is vibrational frequency? Explain various types of stretching and bending vibration with suitable examples. (12)

b) Explain why aromatic amine absorbs at higher frequencies in comparison to aliphatic amines. (06)

c) Why is infrared spectroscopy widely used for the identification of organic compounds? (08)

d) Distinguish among microwave spectroscopy, Raman spectroscopy and infrared spectroscopy. (09)

SECTION B

(Answer ANY THREE questions from this section in Script B)

5. a) Define Para-magnetism. Explain the magnetic properties of N_2 and O_2 based on molecular orbital theory. (10)

b) Calculate bound order of following molecular and draw the chemical structures: O_3, He_2^+, SO_3, NO_2^-. (10)

c) In periodic table – group IVA, carbon is a non-metal, silicon and germanium are metalloids, tin and lead are metals. Explain why is this so? (09)

d) What is metallic bound? Explain with diagram. (06)

6. a) What is conducting polymer? Write down the properties of conducting polymer. (09)

b) Briefly describe the mechanism of free radical polymerization. (10)

c) What is SN2 reaction mechanism? Explain the effect of protic and aprotic solvents ou the SN2 reaction. (11)

d) Write a brief note on "Boud Fission'. (05)

7. a) What is meant by "coordination complex'? Make drawing to represent the structure of following compounds: (i) $[Zn(NH_3)_4Cl_2]^{2+}$ (ii) $[Cr(H_2O)_6]^{3+}$ (iii) $[Ni(H_2O)_6]^{2+}$ (10)

b) What is d-d splitting? Explain based on crystal field theory. (10)

c) Arrange following compounds based on increasing magnetic moments: $Co(NH_3)_6Cl_2$, $Co(H_2O)_6Cl_2$, $K_3[Fe(CN)_6]$, $K_4[Fe(CN)_6]$ (08)

d) H_2O coordinates with H^+ ion forming H_3O^+. Do you expect coordination of another H^+ ion forming H_4O^{2+}? (07)

8. a) What is effective atomic number? Describe Sidwick's theory of complex compound formation with limitations. (10)

b) How would you differentiate between thermosetting and thermoplastic polymer? (08)

c) Why does conductivity of metal decreases with increasing temperature? (07)

d) Draw the crystal structure of silicon. $SiCl_6$ can be formed, but CCl_6 don't-Explain. (10)

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

B. Sc. Engineering 1st Year 2nd Term Examination, 2017
Department of Electronics and Communication Engineering
CSE 1209
(Computer Fundamentals and Programming)

TIME: 3 hours   FULL MARKS: 210

N.B. i)   Answer **ANY THREE** questions from each section in separate scripts.
ii)   Figures in the right margin indicate full marks.

SECTION A

(Answer **ANY THREE** questions from this section in Script A)

1.   a)   What is meant by computer? Write about the generations of computer with short   (10)
description of each generation.
b)   Classify computer according to size and applications.   (06)
c)   What are the common peripheral devices of a computer? Describe their   (13)
functionalities in brief.
d)   What are the main components of a computer? Differentiate between storage media   (06)
and storage device.

2.   a)   Draw the schematic diagram of a digital computer. Also draw the system bus of a   (08)
computer system.
b)   What is meant by physical port? Write short notes on: (i) Parallel port, (ii) USB port,   (12)
and (iii) Fireware port.
c)   What is ROM? Explain different types of ROM.   (08)
d)   A computer has 4 GB of memory. Each word in this computer is 32 bytes. What do   (07)
you mean by this computer has 4 GB of memory? Also determine how many bits are
needed to address any single word in memory.

3.   a)   Explain the working principle of magnetic hard disc with proper diagram.   (07)
b)   Compare and contrast between RAM, ROM, and cache memory. Also explain the   (12)
evolution of RAM from SDR to DDR4.
c)   Write brief descriptions about the security threats involved in computer security.   (08)
d)   Write short notes on: (i) Logic Bomb, (ii) Worm, (iii) Heuristics, and (iv) Integrity.   (08)

4.   a)   Define algorithm and flowchart. Classify algorithm according to implementation and   (09)
design paradigm.
b)   Write the pseudocode, algorithm and flowchart that will read the four sides of a   (10)
quadrangle and decide whether it is a rectangle, square, trapezium or rhombus. Also
determine the area after deciding on the type of quadrangle.
c)   What is an operating system? Explain the major functions of an operating system.   (09)
d)   What is meant by network security? Explain three security properties.   (07)

(Answer **ANY THREE** questions from this section in Script B)

5. a) Write down a sample "Hellow World" printing program in C and also demonstrates (10) each parts of it.

    b) Distinguish between the following pairs: (06)
        (i) main() and void main(void)
        (ii) int main() and void main()

    c) What is C Tokens, classify and demonstrate different C Tokens with examples. (11)

    d) Evaluate the following arithmetic expressions step by step with the precedence of (08) operators.
        (i) $x = 9 - 12/3+3*2-1$
        (ii) $x = 9 - 12/(3+3)*(2-1)$

6. a) What is Implicit and Explicit type conversion and also draw the conversion (08) hierarchy.

    b) Describe switch statement with its general form and also draw its flowchart. (12)

    c) Relationship between Celsius and Fahrenheit is governed by the formula $F = 9C/5+32$, write a program to convert the temperature from Celsius to Fahrenheit. (08)

    d) What is defined by array? Differentiate between (i) one dimensional and (ii) two (07) dimensional arrays.

7. a) Discuss Compile time and Runtime Initialization of one-dimensional arrays with (13) suitable examples?

    b) Suppose you have an integer type of array which has some integer numbers, you (12) have to insert a new value in the first position of that array.

    c) "All character arrays are not string but all strings are character array" – justify the (05) statement.

    d) Write a C program to count the number of words in a line of string. (05)

8. a) Write down the differences between call by value and call by reference. (08)

    b) Write a program using pointer to determine the length of a character string. (09)

    c) Write a program to convert decimal number to binary using recursion function. (10)

    d) Write a program to copy the contents of one file to another. (08)

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 1ˢᵗ Year 2ⁿᵈ Term Examination, 2017
Department of Electronics and Communication Engineering
ECE 1209
(Analog Electronics-I)

TIME: 3 hours   FULL MARKS: 210

N.B. i) Answer **ANY THREE** questions from each section in separate scripts.
   ii) Figures in the right margin indicate full marks.

SECTION A

(Answer **ANY THREE** questions from this section in Script A)

1. a) What is load line? Explain the effects of changing the levels of base current, collector (10) resistance, and V_{cc} on the transistor operating point (Q) using the load line analysis.
   b) Explain the factors that affect the stability of a transistor circuit. How does an (10) additional emitter resistance improve the stability? Explain in brief considering the physical happenings.
   c) How can you design an inverter switch using bipolar junction transistor? (05)
   d) Determine the quiescent levels of I_{CQ} and V_{CEQ} for the following network shown in (10) figure 1(d).

Fig. 1(d)
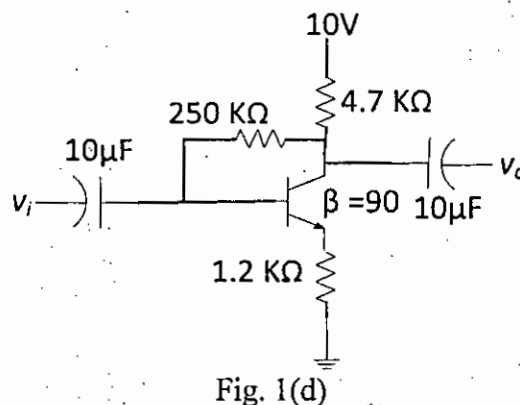
2. a) What is the necessity of BJT modelling? Write down the advantages and (07) disadvantages of r_e model.
   b) Derive the expression for (i) Z_i, (ii) Z_o, (iii) A_v, and (iv) A_i of common emitter fixed (12) bias configuration in terms of r_e.
   c) For the following network, determine: (i) r_e, (ii) Z_i, (iii) Z_o, (iv) A_v, and (v) A_i (16) considering connected C_E (bypassed) and without C_E (unbypassed). Also comments on the obtained voltage gain.

Fig. 2(c)
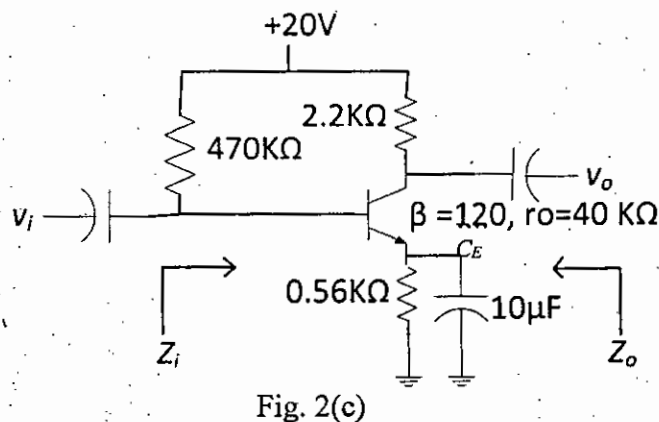
3. a) "The input impedance is a function of load impedance" – Justify the statement using (10) the hybrid modeling concept.
   b) What is Darlington pair circuit? Derive the expression for current gain (A_I) of (09) Darlington pair using h-parameters and comments on the obtained expression.

Page: 1 of 3

c) Determine A_I, A_v, R_i, and R_o for the following two-stage cascade network using (16) simplified hybrid model. Given that $h_{ie} = 1.1$ K, $h_{re} = 2.5 \times 10^{-4}$, $h_{fe} = 50$, and $h_{oe} = 25$ $\mu A/v$. The symbols have their usual meanings.
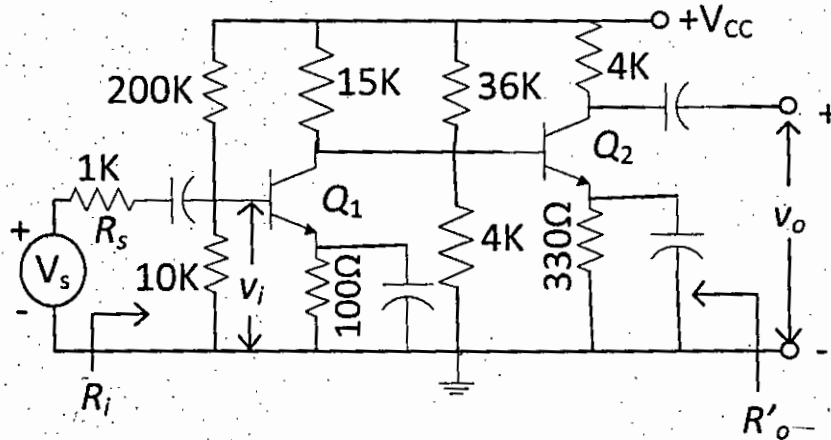

Fig. 3(c)

4. a) "The efficiency of power amplifier increases with smaller input operating cycle" – (10) justify the statement with necessary diagrams.

b) Why the push-pull power amplifier is called so? Deduce the expression of maximum (10) efficiency of push-pull power amplifier.

c) What are the components involved in low and high frequency response of bipolar (10) junction transistor circuits? Find the frequency for each component and explain the overall frequency response using necessary diagram.

d) Define Miller effect. (05)

SECTION B

(Answer **ANY THREE** questions from this section in Script B)

5. a) Show that electron moves in a parabolic path in the region between two parallel (10) plates of a capacitor.

b) Prove that a cathode-ray tube may be used as a linear voltage indicating device. (10)

c) Discuss about the path of a charged particle in presence of parallel electric and (10) magnetic fields.

d) Write short note on magnetic deflection and its sensitivity. (05)

6. a) Write down the differences between FET and BJT. (08)

b) Explain the voltage divider biasing of FET amplifier and consequently discuss the (12) effect of R_S on the resulting Q-point.

c) For the following network, determine followings: (i) V_{GSQ}, (ii) I_{DQ}, (iii) V_D, (iv) V_G, (15) (v) V_S, and (vi) V_{DS}.
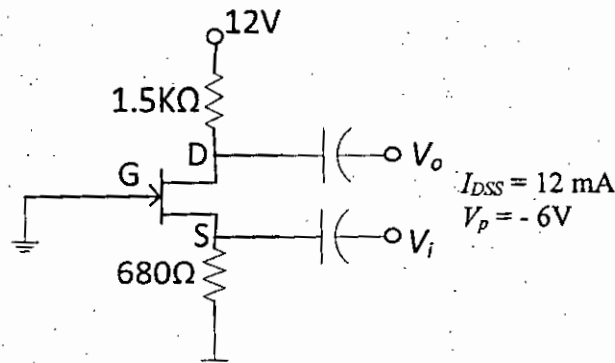

Fig. 6(c)

7. a) Define transconductance. Explain the effect of drain current on transconductance (09) factor of FET.

b) Draw a JFET common gate configuration circuit and its equivalent circuit. From this (14) circuit, prove that $A_V = g_m R_D$, where the symbols have their usual meanings.

c) A dc analysis of the source-follower network shown in the following figure has (12) $V_{GSQ} = -2.86$ V and $I_{DQ} = 4.56$ mA. Determine (*i*) g_m, (*ii*) r_d, (*iii*) Z_i, (*iv*) Z_o without r_d, and (*v*) A_v without r_d.

9 V

$I_{DSS} = 16$ mA
$V_p = -4$ v
$y_{os} = 25$ µS

0.5 µF

0.05 µF

V_i 1 MΩ
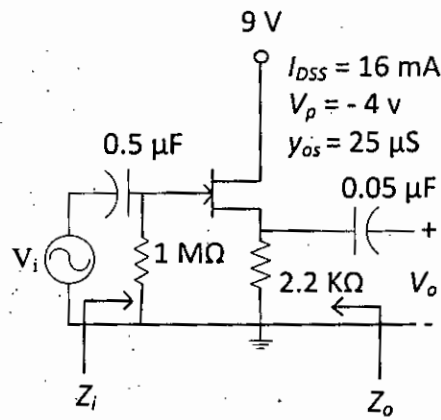
2.2 KΩ V_o

Z_i Z_o

Fig. 7(c)

8. a) Describe the basic operating principle of a solar cell. (10)
   b) Describe the working principle of photo-conductive cells. Also mention some (10) practical applications of photo-conductive device.
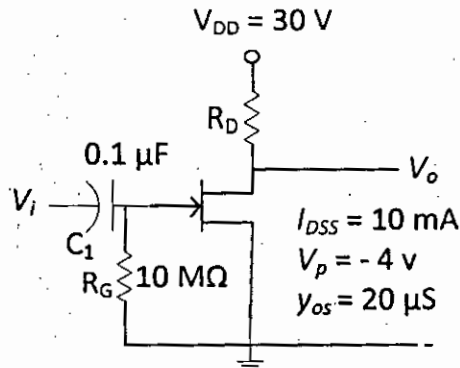   c) Design the following fixed biased network to have an ac gain of 10. (15)

$V_{DD} = 30$ V

R_D

0.1 µF V_o

V_i

C_1

R_G 10 MΩ

$I_{DSS} = 10$ mA
$V_p = -4$ v
$y_{os} = 20$ µS

Fig. 8(c)

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 1st Year 2nd Term Examination, 2017
Department of Electronics and Communication Engineering
Hum 1209
(English)

TIME: 3 hours   FULL MARKS: 210

N.B. i) Answer **ANY THREE** questions from each section in separate scripts.
 ii) Figures in the right margin indicate full marks.

SECTION A

(Answer **ANY THREE** questions from this section in Script A)

1. a) Make sentences using Modal auxiliaries to express each of the following: (14)
    (i) past ability
    (ii) guess about the future
    (iii) opportunity in the past which was not discharged
    (iv) logical deduction in the present
    (v) preference
    (vi) Inference
    (vii) strong possibility
   b) Make sentences on the following structures using the verbs given in brackets. (12)
    (i) Subj. + vit + adverbial of place.   (be verb)
    (ii) Subj. + vit + adverbial of direction+ adverbial of time.   (go as verb)
    (iii) Subj. + Linking verb + adj. complement.   (sound as verb)
    (iv) Subj. + Linking verb + Noun complement+ extension.   (remain as verb)
    (v) Subj. +Transitive verb + object + adj. complement.   (believe as verb)
    (vi) Subj. + Transitive verb + object + Noun complement   (believe as verb)
   c) Make sentences using the following phrases and idioms. (09)
   A lame excuse; Fair game; Street smart; Sine die; Pros and cons; Come of.

2. a) Make WH question with each of the underlined word/words of the following (14)
   sentences.
    (i) Her sole object in life is to become a travel writer.
    (ii) The proposal will go ahead despite strong objections.
    (iii) He thinks about money.
    (iv) She wasn't a strong swimmer.
    (v) His legs felt weak.
    (vi) It is loft deep.
    (vii) Fifty miles is a long distance.
   b) Make sentences using the following words as directed. (12)
   Measure (as noun), Object (as verb), Park (as verb), Round (as noun), Round (as
   adjective), Second (as verb).
   c) Change the following words as asked in brackets and make sentence with the (09)
   changed forms.
   Eradicate (into noun), Private (into noun), Loveliness (into adj.), Choose (into noun),
   Blood (into verb), Advice (into verb).

3. a) Correct the following sentences. (14)
    (i) Army is our national pride.
    (ii) The water has no color.
    (iii) We are hoping a rise in the food prices this month.
    (iv) The girl took his birth in an educated family.
    (v) He shall mend his pencil.
    (vi) He hopes he will not pass in exam.
    (vii) Mamun forwarded himself as a candidate.
   b) Make a new word with each of the following prefixes and suffixes and use them in (12)
   sentences.
   Be ...., For ...., Mal ...., ... age, ... ling, ... way.

c) Make sentences expressing the following notions/emotions. (09)
(i) Anger, (ii) Surprise, (iii) Apology, (iv) Permission, (v) worry, (vi) Pleasure.

4. a) Transform the following sentences as directed. (14)
        (i) The man who is walking along the road looks tired. (Simple)
        (ii) I have no money to spare. (Complex)
        (iii) He is short but his wife is tall. (Complex)
        (iv) Dhaka is the largest city in Bangladesh. (Comparative)
        (v) Dhaka is the largest city in Bangladesh. (Positive)
        (vi) Please come immediately. (Passive)
        (vii) As soon as I reached the station, the train left. (Negative)

b) Make one Antonym and one synonym of each of the following words and make (12)
sentences with them.
Adverse; Bonafide; Encourage; Hazard.

c) Supply a suitable word/phrase to fill in the blanks. – (09)
        (i) I can walk 10 miles at a ....
        (ii) The new airport is a .... and nobody likes it at all.
        (iii) He turned ...... my proposal.
        (iv) You should give ...... your habit of smoking.
        (v) Cancer is caused by ....
        (vi) Let not a noise .... made.

SECTION B

(Answer **ANY THREE** questions from this section in Script B)

5. a) Read the following passage carefully and answer the questions that follow. (20)
At present women's working area is limited to household work in Bangladesh. They are mainly responsible for working, cleaning, washing, childcare, etc. although some ladies are working outside their family, but it seems to be additional duty to them and taking care of their family is their prime concern and so responsibility. What they do is but unassessed in importance of economic, social and psychological context. All of the things, they do, if are done with women not of own family, it would signify how life is in economic, social and psychological consideration. So working women in Bangladesh are overburdened or double burdened. And then we can perceive the position of women of a family; otherwise not. In rural area women do not work in the field but they are the major contributors to agricultural productivity. They are responsible for grain processing and storage, growing family food and raising livestock. All these works are unrecognized as economically productive. But instead of women how can men think of a pretty economic state of a family? Without women the beauty of a good economic state of a family can't be achieved in a man's life. So women often are considered a treasurer of a family. But the ownership of or access to land and other productive resources such as plough, trade, marketing different types of productive goods, etc. are tremendous importance to the subsistence and quality of life of Bangladeshi women. Women, who are landless, widowed or without families face a miserable existence, as there is little to sustain them in terms of employment in the villages. But socially and economically women are deprived. How a society can progress with all ones in terms of manners, co-operation, competition, liberality, etc. is not a point of discussion with women. Women, the most vital part of a society, accompany children when they grow up. It can be accounted a narrow state of how children grow up culturally. Since childhood, also women's inheritance and property rights, marriage, are governed by their guardians still. So women are in a subordinate position in a society. But without women to have a good economic and social development is not only impossible but also un-imagined.
Questions:
        (i) What is the importance of women in a family and how can we perceive this?
        (ii) How are women considered a treasurer of a family?
        (iii) What do the Bangladeshi women consider as criteria for importance in a family?
        (iv) How are women deprived of their rights in a society?

b) Make a précis of the above written passage (Q. 5. a) with a suitable title. (15)

6.   a)   Write a listing paragraph on ignorance. (Around 1200 words)   (18)

     b)   Write a letter to the editor of a newspaper demanding better medical facilities in   (17)
         government hospitals.

7.   a)   Amplify the idea "A thing of beauty is a joy forever." (Around 1200 words)   (20)

     b)   Write a letter to younger brother on the right use of time. (Around 800 words)   (15)

8.   Write a free composition on one of the followings. (Around 2000 words)   (35)

        (i) Peace and economic development.

        (ii) Drug addiction of youths and economic damage.

B.Sc. Engineering 1st year 2nd Term Examination, 2017

Department of Electronics and Communication Engineering
KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Math 1209
(Mathematics II)

TIME: 3 hours   FULL MARKS: 210

N.B. i) Answer **ANY THREE** questions from each section in separate scripts.
     ii) Figures in the right margin indicate full marks.

SECTION A

(Answer **ANY THREE** questions from this section in Script A)

1.   Solve any three of the followings;   (35)

   (a) $Sin^{-1}\dfrac{dy}{dx} = x + y$

   (b) $y(3+4xy^2)dx + x(2+4xy^2)dy=0$

   (c) $(2x+3y-1)dx + (3x-5y+8)dy=0$

   (d) $(x^2y-2xy^2)dx - (x^3-3x^2y)dy=0$

2.   Solve any three of the followings;   (35)

   (a) $\dfrac{d^2y}{dx^2}+9y = 5x^2$

   (b) $y_2-4y_1+4y = e^{2x}+x^2+\cos x$

   (c) $\dfrac{d^2y}{dx^2}+3\dfrac{dy}{dx}+2y = xe^x$

   (d) $(D^2+1)y= \sin 3x \cos x$

3. a) Solve $(1+2x)^2 d^2y/dx^2 - 6(1+2x)dy/dx+16y = 8(1+2x)^2$ (13)

   b) Solve $y_2+9y = \sin(x+y)$, given that $y(0)=1$, $y'(0)=3$ (12)

   c) Solve $y\dfrac{d^2y}{dx^2}-(\dfrac{dy}{dx})^2 = y^2 \log y$ (10)

4. a) Define order and degree of the differential equation with example. Form the   (13)
      differential equation of $xy = ae^x + be^{-x} + x^2$, where a and b are arbitrary constant.

   b) Solve $d^2y/dx^2 + 4y = \tan 2x$ by the method of variation of parameter.   (12)

   c) Solve $xy''+(x-2)y'-2y=x^3$ using the method of factorization of operator.   (10)

Page: 1 of 2

(Answer **ANY THREE** questions from this section in Script B)

5. a) Find the angle through which the axes to be rotated to eliminate the cross terms from the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ (15)

    b) After reducing to standard form, obtain the length of the axes, center (if any) and vertices of $9x^2 - 12xy + 9y^2 - 4x + 6y - 13 = 0$ (20)

6. a) Write the transformation equations between Spherical, Polar and Cartesian coordinates. Also find the Spherical, Polar coordinates of $(1, -\sqrt{3}, -2)$. (11)

    b) Find the length of the projection of the line segment connecting $(1, -2, 3)$ and $(4, -3, 1)$ on the line $2x+3y-4z+7=0=4x+6y-z+8$ (14)

    c) Find the equation of the planes through $(0, 4, -3)$, $(6, -4, 3)$ which cuts off from the axes intercepts whose sum is zero. (10)

7. a) Find the equation of the right circular cylinder of radius 5, whose axis passes through $(1, -1, 2)$ and is parallel to a line having d. c. 's $(3/7, -2/7, 6/7)$. (14)

    b) Find the center and radius (if possible) of the circle $2x^2+2y^2+2z^2-4x+16y+8z-13=0$, $x-y+z-3=0$ (12)

    c) Obtain the condition so that the lines $\dfrac{x-a_1}{l_1} = \dfrac{y-b_1}{m_1} = \dfrac{z-c_1}{n_1}$ and (09)

    $\dfrac{x-a_2}{l_2} = \dfrac{y-b_2}{m_2} = \dfrac{z-c_2}{n_2}$ lie on a plane.

8. a) Find the shortest distance and its equation of the lines $x+y=0$, $z=4$ of (18)

    $\dfrac{x-1}{4} = \dfrac{y-2}{3} = \dfrac{z-36}{-6}$

    b) Find the distance of $(2, 3, -4)$ from the plane $3x-4y+5z+7=0$ measured parallel to the (10) line $\dfrac{2x-1}{3} = \dfrac{y+5}{3} = \dfrac{z-1}{-2}$

    c) Find the angle between the lines AD and BC where A(2,3,4), B(-2,4,-3), C(4,3,-2) and D(1,5,7). (07)