KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 1st Year 2nd Term Examination, 2018
Department of Electronics and Communication Engineering
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) What is molar conductance? Show graphically the variation of equivalent (10)
      conductance against $\sqrt{c}$ for $HClo_3$, $NiSO_4$ and H_2BO_3. Explain the nature of these
      curves.
   b) State Kohlrausch's law of ionic mobilities. How does it help in determining the (10)
      equivalent conductance of weak electrolytes?
   c) Describe the electrical double layer. Distinguish between thermodynamic potential (10)
      and electro kinetic potential from the double layer mechanism.
   d) 0.5N solution of a salt placed between two platinum electrodes, 20cm apart and area (05)
      of cross section 4 cm^2 has a resistance of 25 ohms. Calculate the equivalent
      conductance of the solution.

2. a) What do you mean by free energy of reaction? Establish thermodynamically the (12)
      relationship between EMF and heat of reaction. Write down the significance of this
      relation.
   b) What is Li-intercalation? How does the Li-ion battery develop voltage? (10)
   c) What is salt bridge and why is it used? (08)
   d) The emf of the following cell at 25^0 is 0.112V. (05)
      $SCE \parallel Unknown\ Solution|C_6H_4(OH)_2, C_6H_4O_2|Pt$. If the electrode potential of
      calomel electrode is 0.242V, find the P^H of the solution ($E_Q^o = 0.699V$).

3. a) What are meant by electronic, vibrational and rotational band spectra? Discuss (08)
      briefly the origin of these spectra.
   b) Calculate the value of absorption maximum for the compound as shown below: (07)
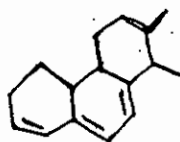
      Do Woodward-Fisher rules obey strictly on all dienes?

   c) What is meant by forbidden transitions? Describe the various types of absorption (10)
      band which arise as a result of the electric transition.
   d) Describe hyper chromic and hypscochromic shift. In polar solvents $\eta \to \pi^*$ (10)
      transitions undergo bathochromic shift but $\pi \to \pi^*$ transitions usually undergo
      hypscochromic shift- Explain.

4. a) What is photochemistry? Discuss briefly florescence, phosphorescence and (10)
      luminescence.
   b) What is meant by polarizability of molecule? Why symmetric stretching of CO_2 (09)
      molecule is Raman active but IR inactive-Explain.
   c) What is finger print region in IR spectra and why is it so called? (08)
   d) Write a short note on Raman scattering. (08)

SECTION B

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

5. a) Calculate the bond order of following ions and indicate which are paramagnetic in nature: N_2^-, O_2^{2-}, He_2^+.   (10)

   b) Draw the electronic structure of following molecules or ions: O_3, NO_3^-, CO.   (10)

   c) What is malleability and ductility, explain with diagram.   (08)

   d) Write down the differences between Si and Ge.   (07)

6. a) What are chelate compounds? Give three examples of bidentate chelate compounds.   (08)

   b) Make drawing to represent the structures of the following complex compounds, along with their waves: (i) $[Zn(NH_3)_4 Cl_2]^{2+}$, (ii) $[Cr (H_2O)_6]^{3+}$ (iii) $[Ni(H_2O)_6]^{2+}$.   (10)

   c) What is d-d splitting? Explain the distortions of geometry of metal complexes.   (10)

   d) Write short note on Geometrical isomers.   (07)

7. a) Define nucleophiles and electrophiles. "Polar aprotic solvents good for SN_2 reactions"- Explain with examples.   (10)

   b) "$SiCl_6$ can be formed but CCl_6 don't"- Explain.   (08)

   c) What is carbocation and Carcanions, provide three examples, each?   (07)

   d) Elucidate a reaction mechanism of "Electrophilic addition to alkene" with an example.   (10)

8. a) What is co-polymer? Write down the differences between thermosetting and thermoplastic polymers.   (07)

   b) Define conductive polymer. Provide the advantages of conducting polymers over conventional polymers.   (10)

   c) What is Oligomers? Explain the reaction mechanism of free radical polymerization, with an example.   (10)

   d) Write a short notes on "synthesis of Nylon 6,6 and Teflon."   (08)

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 1st Year 2nd Term Examination, 2018
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) Define computer. Draw a schematic diagram of a personal computer and also describe each part in it briefly. (16)
   b) How can computer be categorized in accordance with its size and application. (07)
   c) Write short notes on different storage media. (12)
      i) Cache and main memory
      ii) Flash memory
      iii) Magnetic disk

2. a) Briefly discuss about database and networks. (06)
   b) Define capacity and access time of memory. Describe these with example. (08)
   c) Write short notes on (i) Serial port, (ii) Parallel port, (iii) PS/2 port, and (iv) USB port. (14)
   d) A computer has 256 MB of memory. In this computer, each word is 8 bytes. How many bits are needed to address any single word in memory? (07)

3. a) Define information system. Briefly describe the schematic model of an information system. (02+08)
   b) What are the main parts of computer-based information (CBIS). Shortly describe any two parts of them. (13)
   c) What is operating system? What are the primary functions of an operating system? Explain in details. (04+08)

4. a) Define malicious software. Write short notes on (i) Worm, (ii) Trojan horse, (iii) Virus, and (iv) Logic bomb. (02+08)
   b) What are the advantages and disadvantages of high-level language over low-level language? (06)
   c) Write the pseudocode, algorithm, and flowchart that will find the largest number among three numbers and print the largest number. (09)
   d) Differentiate among LAN, MAN, and WAN. (10)

SECTION B

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

5. a) What is programming language? Write down the importance of C as a programming language. (07)
   b) Write down the basic structure of C program and briefly describe each component in it. (14)
   c) Differentiate global and local scope of a variable with appropriate example codes. (08)
   d) Determine the value of each of the following logical expressions if $x = 8$, $y = 10$, and $z = -5$. (06)
      (i) $y - z > x$ && $y > z$ || $x == 5$
      (ii) $(x/2.0 == z/2.0$ && $y/2.0! = z) || z < 1$

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6. a) How precedence of operators determines the result of an expression, explain with two examples. (10)

   b) Write the structure of nested if else statement and explain it with example. (10)

   c) Write a program to check whether a given character is VOWEL or CONSONANT using switch statement. (10)

   d) Write a program that will read the value of x and evaluate the following function using conditional operator: (05)

$$y = \begin{cases} 1 & \text{for } x > 0 \\ 0 & \text{for } x = 0 \\ -1 & \text{for } x < 0 \end{cases}$$

7. a) What is array? Write down some importance of array in C programming. (07)

   b) Differentiate between call by value and call by reference methods with examples. (08)

   c) Write a program in C that converts a string to its uppercase. (07)

   d) The annual examination results of 100 students are tabulated as follows: (13)

Roll no	Subject 1	Subject 2	Subject 3

Write a program to read the data and determine the following:
   (i)   Total marks obtained by each student.
   (ii)   The highest marks in each subject.
   (iii) The student who obtained the highest total marks.

8. a) Define actual parameters and formal parameters. What are the similarities between variables and functions? (10)

   b) Write a function named check_prime that returns 1 if it's argument is prime number and return 0, otherwise. (08)

   c) Write two C functions: one to return the sum of two complex numbers passed as parameters and other to return the product of two complex numbers passed as parameters. (10)

   d) Write a program to copy the contents of one file to another. (07)

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 1st Year 2nd Term Examination, 2018
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 the necessity of transistor biasing? Design a fixed bias circuit in order to　(09)
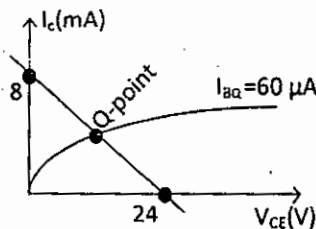　　　obtain the following load line and Q-point.

Fig. 1(a)

　　b)　How is the operating point of transistor affected by increase of surrounding　(06)
　　　temperature?
　　c)　Write the mathematical expressions of stability factors and hence show that voltage　(10)
　　　divider bias configuration is the most stable.
　　d)　What is the condition for approximate analysis of voltage divider bias configuration?　(10)
　　　Determine the values of I_{CQ} and V_{CEQ} of the following network using approximate
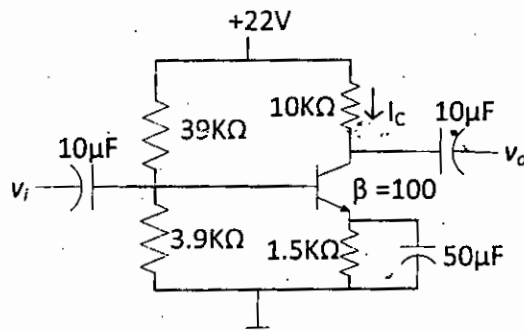　　　analysis.

Fig. 1(d)

2.　a)　What is meant by BJT modeling? Write down the procedure of obtaining ac　(07)
　　　equivalent circuit of a BJT.
　　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 modeling concept.
　　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 (un-bypassed). Also comments
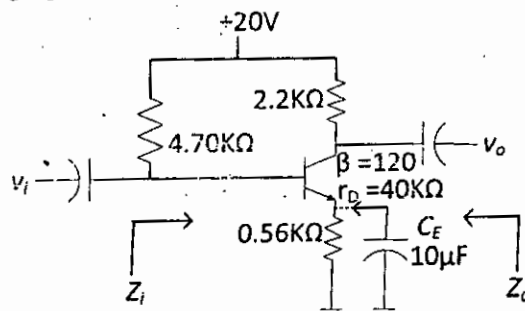　　　on the obtained voltage gain.

Fig. 2(c)

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3. a) Define hybrid model and hybrid parameters. Draw the hybrid models of three different configurations of transistor. (10)

   b) Derive the expression for current gain (A_I) of Darlington pair circuit using h-parameters and comments on the obtained expression. (09)

   c) A two-stage amplifier circuit (CE-CC) is shown in Figure 3(c). The transistor parameters at the Q-point are: (16)

   $h_{ie} = 2k$ $h_{fe} = 50$ $h_{re} = 6 \times 10^{-4}$ $h_{oe} = 25\ \mu A/V$
   $h_{ic} = 2k$ $h_{fc} = -51$ $h_{rc} = 1$ $h_{oc} = 25\ \mu A/V$

   Find the input and output impedances and overall voltage and current gains of the combined circuit.
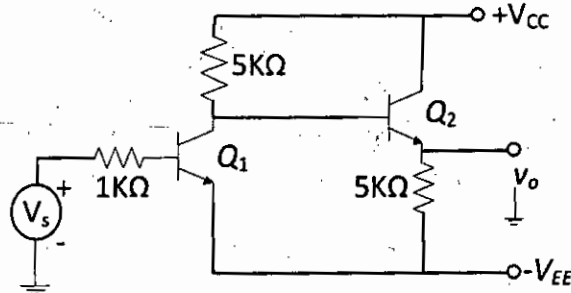

Fig. 3(c)

4. a) "Power amplification is mainly a nonlinear process" – justify the statement. (06)

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

   c) What is Miller capacitance? Write down the effect of Miller capacitance on the high frequency cutoff of bipolar transistor circuit. (06)

   d) Discuss on the effect of increasing number of stages on frequency response of transistor circuit. (07)

   e) What are the major considerations in designing power amplifier circuits? Explain in brief. (06)

SECTION B

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

5. a) "A cathode ray tube may be used as a linear voltage indicating device" – justify the statement. (10)

   b) Prove that deflection on the screen of a cathode ray tube is directly proportional to the deflecting voltage between the plates. (10)

   c) Derive the equation of magnetic deflection sensitivity of a CRT. (10)

   d) Write your idea about radius of circles generated by different particles moving with different initial velocities in a magnetic field. (05)

6. a) Briefly explain the reasons behind the higher input impedance of FET. (08)

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

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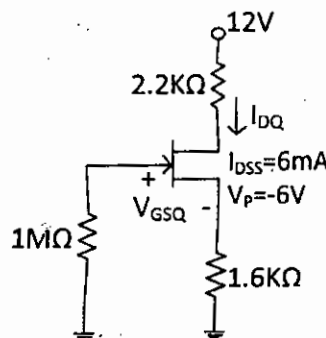

Fig. 6(c)

7. a) Give the mathematical derivation of transconductance. (08)

   b) Prove that for a self-bias FET configuration, voltage gain increases $1+g_m R_s$ times, when bypass resistance R_s is used. (12)

   c) The source follower network of the following figure has the Q-point as $V_{GS_Q} = -2.86$V and $I_{D_Q} = 4.56$mA. Determine: (i) g_m, (ii) r_d, (iii) Z_i, (iv) Z_o with and without r_d and (v) A_v with and without r_d. (15)
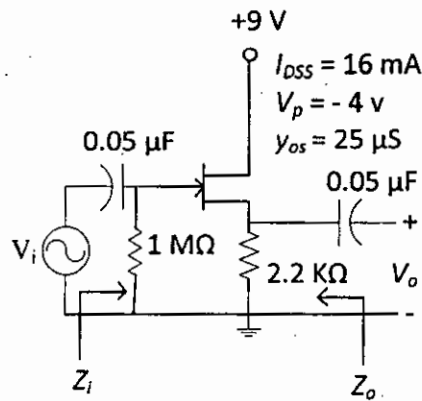

Fig. 7(c)

8. a) What is LCD? Describe the basic operations of LCD panel. (10)

   b) Describe the operating principle of photo-conductive cells. Also mention some practical applications of photo-conductive device. (10)

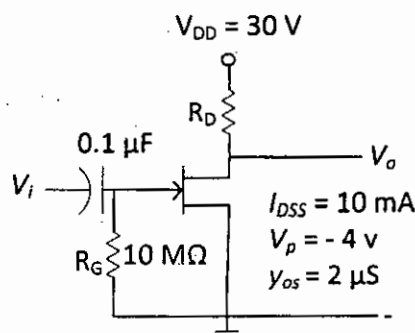   c) Design the following fixed biased network to have an ac gain of 10. (15)

Fig. 8(c)

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 1st Year 2nd Term Examination, 2018
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) Transform the following sentences as directed: (14)
    (i)   There stood two people on board.   (*Complex*)
    (ii)   Since he is talented, he can cut a good figure in exam. (*Simple*)
    (iii) What is lotted cannot be blotted.   (*Active*)
    (iv)   The ship rested unmoving.   (*Negative*)
    (v)   Father wants me to be a teacher.   (*Compound*)
    (vi)   They were hungrier than I thought.   (*Positive*)
    (vii) Lipi is as talented as other students in the class. (*Superlative*)

    b) Make sentences using the following words as directed.   (12)
    After (as Adjective); After (as Conjunction); But (as Pronoun); But (as Adverb);
    Table (as Verb); Bed (as Verb).

    c) Change the following words as directed and make sentences with the changed words. (09)
    Martyr (into Noun); Grace (into Adjective); Beauty (into Verb); Beauty (into Noun),
    Honor (into Adjective), Inferior (into Noun).

2. a) Make sentences expressing the following emotions/notions. (i) Approval, (ii) (14)
    Disapproval, iii) Apology, iv) Farewell v) Threat, vi) Good wishes, vii) Imprecation.

    b) Make "*Wh*" questions from underlined parts of the following answers.   (12)
    (i)   The book on the table is <u>mine</u>.
    (ii)   We know <u>what he will say</u>.
    (iii) The class starts <u>at 8 a.m.</u>
    (iv)   Liza has been studying in this university for <u>four years</u>.
    (v)   He is arrested <u>for his criminal offence</u>.
    (vi)   I am very glad <u>to meet you</u>.

    c) Make a new word with each of the following prefixes and suffixes and use them in (09)
    sentences.
    Fore....., ...age, ...ance,...........ty, ...ab........, be.................

3. a) Make sentences on the following sentences using the words given in brackets.   (14)
    (i)   Subject + intransitive verb + adverbial.   (*go* as verb)
    (ii)   Subject + linking verb + adjective complement. (*Look* as verb)
    (iii) Subject + linking verb + noun complement.   (*Look* as verb)
    (iv)   Subject + transitive verb + gerund as object.   (*Stop* as verb)
    (v)   Subject + transitive verb + object + adjective complement. (*Consider* as verb)
    (vi)   Subject + transitive verb + object + noun complement. (*Consider* as verb)
    (vii) Subject + transitive verb + object + object (*Send* as verb)

    b) Make sentences using the following modals as directed.   (12)
    i)   May (to express guess about the future).
    ii)   May (to express guess about the present).
    iii) Would (to express a polite request).
    iv)   Could (to express opportunity in the past which was not executed).
    v)   Could (to express past ability).
    vi)   Shall (to express an offer).

    c) Supply a suitable word to fill in the blanks.   (09)
    i)   He is busy ....to his friends.
    ii)   He reached the class on ....
    iii) What ....you doing now?

iv) The more you ...., the more you earn.

v) Life........a tale............by an idiot.

4. a) Complete the sentences with subordinate 'clauses' as directed.   (14)

   i) He laid..........., ... (adverb clause of time).

   ii) He cannot work ....(adverb clause of cause).

   iii) ...., I would accept the proposal. (adverb clause of condition).

   iv) ...., is uncertain. (noun clause).

   v) It depends on ....(noun clause).

   vi) I know the time.................. (adjective clause).

   vii) I went to your father.................(adjective clause).

   b) Make sentences from the words in brackets. *One is done for you.*   (12)

   i) *Don't phone Ann now. (She/might/have/lunch; e.g. She might be having lunch.*

   ii) I ate too much. Now I feel sick. (I shouldn't/eat/so much).

   iii) I wonder why Tom didn't phone me. (he must/forget).

   iv) Why did you go home so early? (you needn't/go/home so early).

   v) You have signed the contract. (it/can't/change/now).

   vi) What's Linda doing? I'm not sure. (she/may/watch/television).

   vii) Ann was standing outside the cinema. (she must/wait/for somebody).

   c) Make sentences using the following phrases and idioms.   (09)
   Top dog, Pull well, Point blank; lame excuse; rank and file; out and out.

SECTION B

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

5. a) Read the passage carefully and answer the questions that follow.   (15)
   A person went to a sadhu and asked two questions: (i) why do people say God is everywhere? I see Him nowhere; therefore show me where He is. (ii) Why is man punished for crime, since he is not a free agent, but made to do as God wishes? The Sadhu took up a lump of earth and flung it at the head of the questioner. The man went to the judge and complained against the sadhu for having inflicted a severe pain in his head. The judge had the sadhu arrested and brought up for trial. As the accused stood in the dock, the judge said, "why, instead of answering the complainant's questions, did you through a lump of earth at him?" The sadhu replied, "The blow he received with the lump was an answer to his questions. He has told you that there is a pain in his head. Let him show me the pain and I shall show him God. And why does he complain against me, for what I did was, according to him, an act of God". The judge was pleased with the Sadhu's defense and dismissed the case. The complainant left the court a sadder but a wiser man.
   Questions: i) What were the questions the sadhu asked?

   ii) What did the Sadhu do on hearing the questions?

   iii) How did the Sadhu explain that his action contained the answers to the questions?

   b) Make a précis of the above passage (Q 5.a) with a suitable title.   (20)

6. a) Write a paragraph on studying book.   (15)

   b) Amplify the idea contained in of the following statement.   (20)
   Freedom of speech does not mean license to say whatever you like.

7. a) Write a report on your language laboratory.   (15)

   b) Write a newspaper report about violence in educational institutions.   (20)

8. Write a free composition on anyone of the following: (35)
   a) Religious festivals in Bangladesh. b) Life with diligence

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
B.Sc. Engineering 1st Year 2nd Term Examination, 2018
Department of Electronics and Communication Engineering
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. a) Remove the xy-term from the expression $ax^2 + 2hxy + by^2$ by using the transformed rule of rectangular axes. (12)

   b) What conic does the equation $x^2 - 5xy + y^2 + 8x - 20y + 15 = 0$ represent? Find its standard form. (13)

   c) Find the equation of latus rectum of the conic $x^2 - 4x + 3y = 1$. (10)

2. a) Find the cylindrical and spherical polar coordinates of a point whose rectangular coordinate is (3,-9,2). (10)

   b) Find the equation to the right circular cylinder of radius 3 whose axis passes through (2,-1,3) and has direction cosines proportional to 1,1,2. (13)

   c) A right circular cone is passing through the point (1,1,1) and its vertex is the point (1,0,1). The axis of the cone is equally inclined to coordinate axes. Find the equation of the cone. (12)

3. a) Find the relation for which the straight lines whose direction cosines are given by the relations $al + bm + cn = 0$ and $fmn + gnl + hlm = 0$ are perpendicular. (12)

   b) Find the equation of the planes through $(0,4,-3)$, $(6,-4,3)$ which cutoff from the axes intercepts whose sum is zero. (12)

   c) Find the center and radius of the circle
   $$x^2 + y^2 + z^2 - 2y - 4z - 11 = 0; \quad x + 2y + 2z - 15 = 0$$ (11)

4. a) Justify the lines $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ and $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ are coplanar or not. If coplanar, find the equation of plane. If not coplanar, find the equation of shortest distance. (14)

   b) Find the center and nature of the surface represented by the equation
   $$x^2 + 2y^2 - 3z^2 - 4yz + 8zx - 12xy + 1 = 0.$$ (10)

   c) Find the equation of the sphere which passes through the circle $x^2 + y^2 + z^2 = 5$, $x + 2y + 3z = 3$ and touches the plane $4x + 3y = 15$. (11)

SECTION B

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

5. a) Define order and degree of a differential equation with examples. Determine the differential equation of all circles with center (a, b) and radius r. (12)

   b) Find the particular solution of the differential equation $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} - 2y = 0$ when $x = 0, y = 0$ and $\frac{dy}{dx} = 1$. (11)

   c) Solve the differential equation $(1 + 2x)^2 \frac{d^2y}{dx^2} - 6(1 + 2x)\frac{dy}{dx} + 16y = 8(1 + 2x)^2$. (12)

6.   Solve any three (*03*) of the followings: (35)
   a) $(x^2 + y^2 + 1)dx - 2xydy = 0.$
   b) $2xdy - 2ydx - \sqrt{x^2 + 4y^2}dx = 0$
   c) $\dfrac{dy}{dx} + y = y^2e^x$
   d) $(1 + xy)ydx + (1 - xy)xdy = 0$

7.   Solve the followings: (35)
   a) $\dfrac{d^2y}{dx^2} + 4y = xsinx$
   b) $\dfrac{d^2y}{dx^2} - 4\dfrac{dy}{dx} + 4y = x^2e^{2x}$
   c) $\dfrac{d^2y}{dx^2} - 2\dfrac{dy}{dx} + y = e^xsinx$
   d) $(D^2 - 3D + 4)y = cos(4x + 5)$

8. a) Solve the differential equation $(1 - x^2)\dfrac{d^2y}{dx^2} - x\dfrac{dy}{dx} = 2.$ (11)

    b) Solve the differential equation $y\dfrac{d^2y}{dx^2} - \left(\dfrac{dy}{dx}\right)^2 = y^2 logy.$ (11)

    c) Solve the differential equation $[xD^2 - (x + 2)D + 2]y = x^3, D = \dfrac{d}{dx}$, using the   (13)
        method based on the factorization of the operator.