Delhi International School
Class –XII
Subject – Chemistry
Summer Vacation Homework (2018-19)

1. What type of substances would make better permanent magnets, ferromagnetic or ferromagnetic? Justify your answer.

2. What makes a glass different from a solid such as quartz? Under what conditions could quartz be converted into glass?

3. An element with molar mass 2.7×10^{-2} kg mol^{-1} forms a cubic unit cell with edge length 405pm. If the density is 2.7×10^3 kg m^{-3}. What is the nature of the cubic unit cell?

4. A compound forms hexagonal close packed structure what is the total number of voids in 0.5 mole of it. How many of these are tetrahedral voids.

5. What type of defect can arise when a solid is heated?

6. Explain metal excess & metal deficiency defects.

7. What are amorphous solids? Give four important differences between crystalline and amorphous solids.

8. Differentiate between scholtky and frenkel defect.

9. What is a semiconductor? Describe two main types of semiconductors & explain the mechanism of their conduction?

10. Calculate packing efficiency of a metal crystal for a simple cubic lattice?

11. Why does licl acquire pink colour when heated in Lithium vapours?

12. Explain how vacancies are introduced in an ionic solid when a cation of higher valence is added as an impurity in it?

13. Henry's Law constant for CO_2 in water is 1.67×10^8 Pa at 298K. Calculate the quantity of CO_2 in 500mL of soda water when packed under 2.5 atm CO_2 pressure at 298K.

14. The vapour pressure of pure liquids A and B are 450 and 700mmHg at 350K respectively. Find out the composition of the liquid mixture if total pressure is 600mmHg. Also find the composition of vapour phase.

15. How does always tend to be less soluble in liquids as the temperature is raised?

16. State Henry's Law & mention some important applications of it.

17. What is meant by positive and negative deviations from Raoult's Law and how is the sign of $\Delta_{mix}H$ related to these deviations from Raoult's Law?

18. 19.5g of CH_2FCOOH is dissolved in 500g of water. The depression in the freezing point of water observed is 1.0^0C. Calculate the Van't Hoff factor and dissociation constant of fluoroacetic acid.

19. Explain a peeled egg when dipped in water swells while in saturated brine solution it shrinks.

20. Explain elevation in boiling point with diagram. Show that it is a colligative property. How molecular mass of solute be determined from it?

21. State Raoult's Law for a solution containing volatile liquids. Explain with suitable examples the concept of maximum boiling azeotropes.

22. What is Van't Hoff factor? What would be the value of Van't Hoff factor for association and dissociation of the solute?

23. Explain osmotic pressure with diagram & derive equation to obtain molecular mass.

24. State Kohlrausctis law. What are its applications?

25. Calculate the molar conductivity of a solution of $MgCl_2$ at infinite dilution given that the molar ionic conductivities of λ^0 (Cl^-) = 76.3 S cm$_2$ mol^{-1}).

26. Calculate the standard electrode potential of NI+2/Ni electrode if the cell potential of the cell:

    $Ni|Ni^{+2}(0.01M)|\ |Cu^{+2}(0.1M)|\ Cu\ is\ 0.59V$

    Give E^0 Cu^{2+}/Cu = 0.34V

27. Write the Nernst equation and calculate the e.m.f. of the following cell at 298K:

    $Cu(s)|Cu^{2+}(0.130M)||Ag^+(1.0 \times 10^{-4}M)|Ag(s)$

    Give E^0 (Cu^{2+}/Cu) = +0.34V and E^0 (Ag$^+$/Ag) = +0.80V.

28. Calculate the value of equilibrium constant for the following cell reaction:

    $4Br^- + O_2 + 4H^+ \longrightarrow 2Br_2 + 2H_2O$

    Given E^{0}cell = 0.16V. Comment on the reaction.

29. What is the difference between e.m.f and potential difference?

30. How will you distinguish metallic conduction and electrolytic conductance?

31. What is Nernst equation? Write the mathematical relation.

32. What is corrosion? Give mechanism of rusting of iron. What do you understand by sacrificial protection of corrosion?

33. For a weak electrolyte molar conductance in dilute solution increases sharply as its concentration in solution is decreased. Give reason.

34. Explain discharging and recharging of a lead storage battery.

35. What is the function of salt bridge in an electrochemical cell?

36. What are fuel cells? Explain in detail with suitable diagram. What are their advantages?

37. What is the difference between electrochemical and electrolytic cells?

38. Derive integrated rate equation for a first order reaction.

39. What is the difference between order of reaction and molecularity of a reaction?

40. Derive the units of rate constant for zero order, first order and second order reactions.

41. Explain collision theory in detail.

42. What is rate of a reaction? Discuss briefly the various factors which influence the rate of a chemical reaction.

43. Write Arrhenius equations showing the effect of temperature on the reaction rates. How does it help to calculate the activation energy of a reaction?

44. What is half life period? Derive an mathematical expression for half-life period of a reaction of first order.

45. Define pseudo first order reaction. Give an example for this.

46. What is the difference between catalyst and a photosensitizer?

47. The first order rate constant for the reaction:

$C_2H_5I_{(g)} \rightarrow C_2H_{4(g)} + HI_{(g)}$ at 600K is $1.60 \times 10^{-5}s^{-1}$. It's activation energy is $20gJmol^{-1}$. Calculate the rate constant of the reaction at 700K.

48. A first order reaction takes 69.3 minutes for 50% completion. Calculate the time required for 80% completion of this reaction?

49. Sucrose decomposes in acid solution into glucose and fructose according to the first order rate law with $t_{1/2} = 3hrs$. Calculate the fraction of sucrose which remains after 8hrs.

50. A half life period for radioactive decay of 14C is 5730 year. An archaeological artifact contained wood had only 80% th 14C found in a living tree. Estimate the age of the sample.

51. Calculate two third life of a first order reaction having $k = 5.48 \times 10^{-14}s^{-1}$.

52. The rate constant for the first order reaction is $60s^{-1}$. How much time will it take to reduce the concentration of the reactant to $\frac{1}{16}$th value?

Delhi International School
Class –XII
Subject – Physics
## Summer Vacation Homework (2018-19)

1. A beam of electrons projected along X-axis, experiences a force due to magnetic field along Y axis. What is the direction of magnetic field?

2. A conductor of length L is connected to a dc source of emf $\in$. If this conductor is replaced by another conductor of same material and same area of cross section but of length 3L, how will the drift velocity change?

3. In the circuit shown, $R_1 = 4\Omega$, $R_2 = R_3 = 15\Omega$, $R_4 = 30\Omega$ and $E = 10V$. Calculate the equivalent resistance of the circuit and the current in each resistor.

4. Show a graph for the variation of resistivity with temperature for a typical semiconductor.
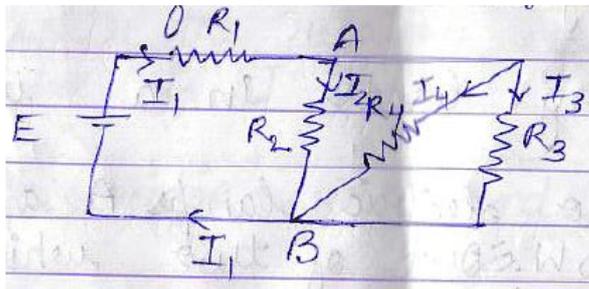

5. The resistance of R draws current from a potentiometer. The potentiometer wire AB, has a total resistance of R_o. A voltage V is supplied to the potentiometer. Draw an expression for the voltage across R when the sliding contact is in the middle of the potentiometer wire.
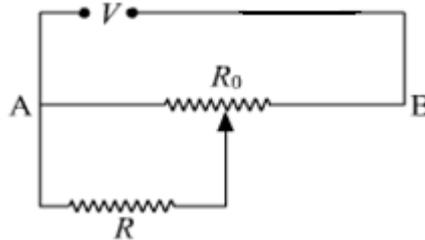
6. When electrons drift in a metal from lower to higher potential does it mean that all the free electrons of the metal are moving in the same direction?

7. Show on graph, the variation of resistivity with temperature for a typical semiconductor.

8. Two wires of equal length, one of copper and the other of manganin have the same resistance. Which wire is thicker?

9. Why lends in a wire do not affect its resistance?

10. Two electric lamps A and B are marked 220V – 100W and 200V – 60W. Out of two which lamp has higher resistance?

11. AB is a potentiometer wire. If the value of R is increased, in which direction will the balance point J shift?
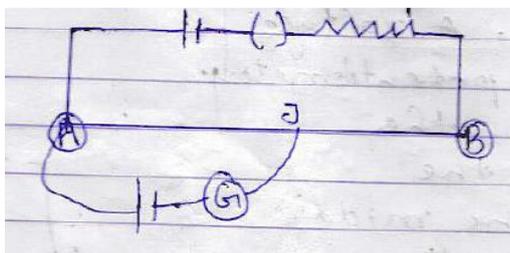
12.   The emf of a cell is always greater than its terminal voltage. Why?
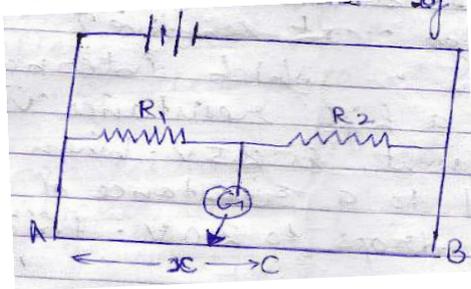
13.   In an experiment on Meter Bridge, if the balancing length AC is 'X', what would be its value when the radius of the meter wire AB is doubled.

14.   Define mobility of a charge carrier. Write the relation expressing mobility in terms of relaxation time. Give its SI unit.

15.   Which material is used for the metre bridge wire and why?
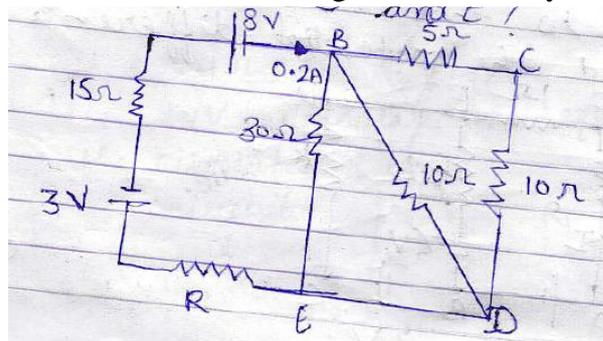
16.   Calculate the value of the resistance R in the circuit so that the current in the circuit is 0.2A. What would be the potential difference between points B and E?

17.   On increasing the current draw from a cell, the potential difference of its terminals is lowered, why?

18.   When is wheat stone bridge most sensitive?

19.   Write any two factors on which internal resistance of a cell depends. The reading of a high resistance voltmeter, when a cell is connected across it, is 2.5V. When the terminals of the cell are also connected to a resistance of 5Ω as shown in fig. the voltmeter reading drops to 2.0V. Find the internal resistance of cell.
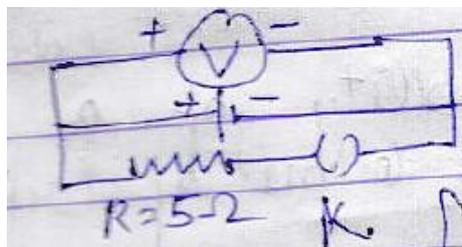

20.   Draw a plot showing the variation of (i) electric field (ii) electric potential (v) with distance r due to a point charge Q.

21.   Using Kirchhoff's rules determine the value of unknown resistance R in the circuit so that no current flows through 4Ω resistance. Also find the potential difference between A and D.
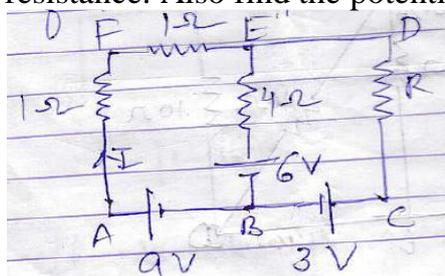
22. Two cells of emf 1.5V and 2.0V having internal resistance 0.2Ω and 0.3Ω respectively are connected in parallel. Calculate the emf and internal resistance of the equivalent cell.

23. Calculate the unknown resistance 'X' and hence find the equivalent resistance in the given circuit?
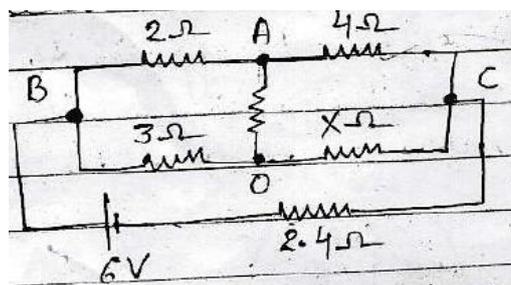
24. A negligibly small current is passed through a wire of length 15m and uniform cross-section $6.0 \times 10^{-7} m^2$ and its resistance is measured 5.0Ω. What is resistivity of material?

25. In the circuit $R_1 = 4Ω$, $R_2 = R_3 = 15Ω$, $R_4 = 30Ω$ and E = 10V. Calculate the equivalent resistance of the circuit and hence current (I) in the circuit. Also calculate current in each resistor.
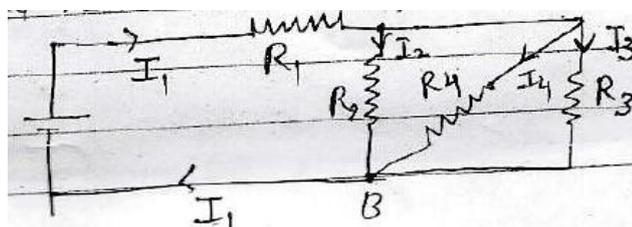
26. The standard resistance coils are made of manganin. Why?

27. What happens to drift velocity (vol) of electrons and the resistance R if the length of a conductor is doubled?

28. Of metals and alloys, which has greater value of temperature co-efficient of resistance?

29. Find the resistance between A and B.
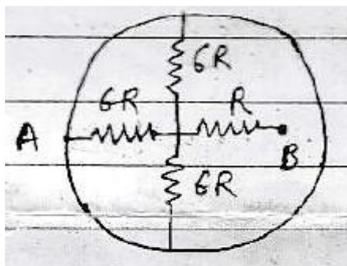
30. Estimate the average drift speed of conductor electrons in a copper wire of cross-sectional area 1.0×10^{-7} m² carrying a current of 1.5A. Assume the density of conduction electrons to be $9 \times 10^{28} m^{-3}$.

31. Does the maximum charge given to a metallic sphere of radius R depends upon wither it is a solid or hollow? Give reason to justify your answer?

32. State Gauss's Law in electrostatics. A cube with each side a is kept in an electric field given by $\vec{E} = Cx\hat{i}$ as shown in figure. Where C is a positive dimensional constant. Find out
   (i) the electric flux through the cube
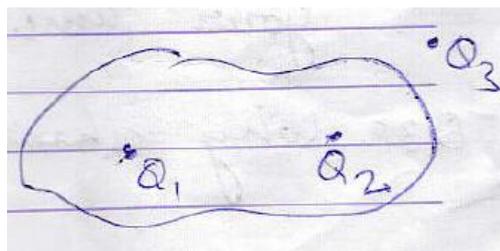   (ii) the net charge inside the cube
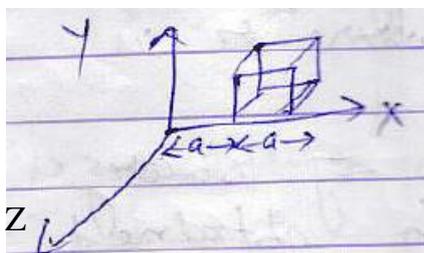
33. Three charges Q_1, Q_2 and Q_3 are placed inside and outside a closed Gaussian surface as shown in figure. Answer the following:

(a) which charges contribute to the electric field at any point on the Gaussian surface?

(b) which charges contribute to the net flux.

(c) If $Q_1 = - Q_2$, will electric field on the surface be zero.

34. Two charges of magnitudes $- 2Q$ and $+ Q$ are located at points $(9, 0)$ and $(49, 0)$ respectively. What is the electric flux due to these charges through a sphere of radius $3a$ with its centre at the origin?
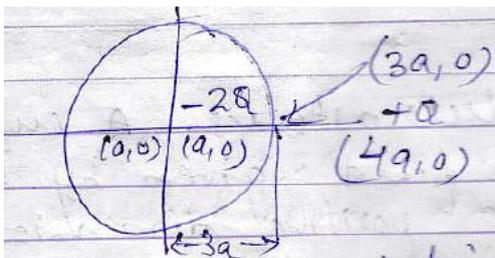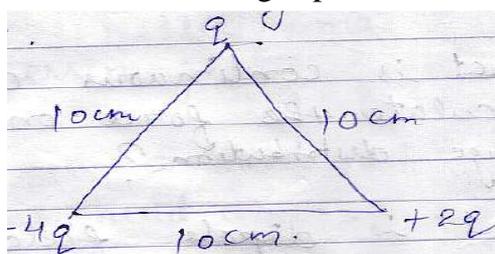

35. Plot a graph showing the variation of coulomb force (F) versus $\left(\frac{1}{r^2}\right)$, where r is the distance between the two charges of each pair of charges: $(1\mu c, 2\mu c)$ and $(2\mu c, - 3\mu c)$. Interpret the graph obtained.
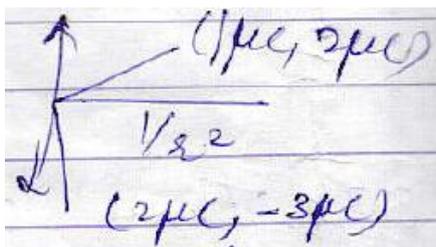
36. Can two equipotential surfaces intersect each other? Justify your answer.

37. Why should electrostatic field be zero inside a conductor?

38. Calculate the work done to dissociate the system of three charges placed on the vertices of a triangle as shown. Here, $q = 1.6 \times 10^{-10}$c.

39. Plot a graph showing the variation of resistance of a conducting wire as a function of its radius, keeping the length of wire and its temperature as constant.

40. V-I graph for a metallic wire at two different temperatures T_1 and T_2 is shown in figure. Which of the two temperatures is higher and why?
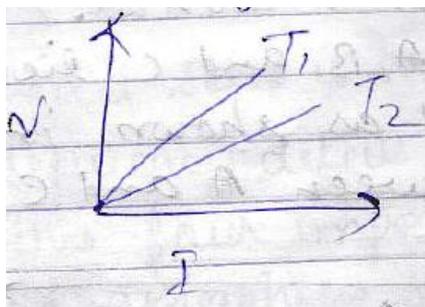
41. State the condition for maximum current to be drawn from a cell.

42. What is continuous charge distribution? How can we calculate the force on a point charge q due to continuous charge distribution?

43. What is dipole field? Why does the dipole field at large distance falls off faster that $\frac{1}{r^2}$?

44. What happens when an electric dipole is held in a non uniform electric field? What will be the force and the torque when the dipole is held parallel or anti-parallel to the electric field?

45. Define emf of a battery. It is really a force? When is the emf of a battery equal to the potential difference between its terminals? Define emf of 1 volt?

46. Three points A, B and C lie in a uniform electric field (E) of 5×10^3 NC^{-1} as shown in the figure. Find the potential difference between A and C.
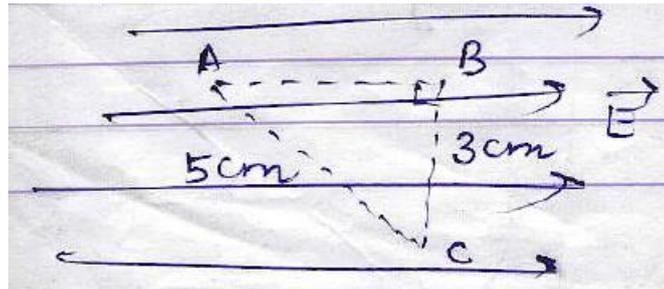
Note: (i) Every student would prepare one chart related to physics.
(ii) Students will prepare the project / activity related to science (theoretically + practically).

Delhi International School
Class –XII
Subject – Biology
Summer Vacation Homework (2018-19)

1. Name the units of vegetative propagation in grasses and water hyacinth.
2. Name the vegetative propagules in the following:
3. Write the name of the organism that is referred to as the 'Terror of Bengal'.
4. Name the mode of reproduction that helps in producing genetically identical offspring's.
5. Banana fruit is said to be parthenocarpic where as turkey is said to be parthenogenetic. Why?
6. State the function of filiform apparatus found in mature embryo sac of an angiosperm.
7. Draw a diagram of microspore of an angiosperm. Label its cellular components only.
8. Give an example of an plant that came to India as a contaminant and is a cause of pollen allergy.
9. Which of the following statement is true for cucurbits?
10. Draw a well labelled diagram of a typical anatropous ovalue?
11. Write the function of tapetum in anthers.
12. Draw and label the enlarged view of microsporangium of an angiosperm. State the function of its innermost wall layer.
13. Explain the importance of syngamy and meiosis in a sexual life cycle of an organisms.
14. Explain the process of pollination in vallisneria.
15. What is pollen-pistil interaction and how is it mediated?
16. Give an example of a plant which came into India as a contaminant of imported wheat and is a cause of pollen allergy.
17. Why do cleistogamous flowers assure seed sets?
18. If the stamens are well exposed, usually which mode of pollination the plant is expected to follow?
19. How do the pollen grains of vallisneria protect themselves?
20. Describe the characteristics of wind pollinated flowers.
21. Gynoecium of a flower may be apocorpous or syncarpous. Explain with the help of an example each.
22. Out of many papaya plants growing in your garden, only a few bear fruits. Give reason.
23. A single pea plant in your kitchen garden produces pods with viable seeds, but the individual papaya plant does not. Explain.
24. Angiosperms bearing unisexual flowers are said to be either monoecious or diocecious. Explain with the help of one example each.
25. Give two reasons for keeping beehives in crop fields during flowering period.
26. Suggest four important steps to produce a disease resistant plant through conventional plant breeding technology.
27. State the similarity and differences between geitonogamy and xenogamy?
28. Name the pouch in which the human testes are present?
29. List different parts of human oviduct through which the ovum travels till it meets the sperm for fertilization.

30. Name the cells that nourish the germ cells in the tests. Where are these located I the testes?
31. Where is acrosome present in humans? Write its functions.
32. Write the location and function of leydig cells in humans.
33. Write the function of seminal vesicle.
34. Write the location and function of the sertoli cells in humans.
35. Write the location and functions of myometrium and endometrium.

Delhi International School
Class –XII
Subject – Mathematics
Summer Vacation Homework (2018-19)

1.   Ex. 3.1   Question No. 3, 5, 6(ii), 7, 10
2.   Ex. 3.2   Question No. 1 (ii, iv), 2 (iii, iv), 3 (iv, v, vii), 4, 5, 7(ii), 9, 10, 12, 15, 17, 18
3.   Ex. 3.3   Question No. 5, 7(i), 9, 10(ii, iii)
4.   Ex. 3.4   Question No. 8, 12, 15, 17
5.   Misc. Ex. on chapter – 3   Question No. 2, 4, 6, 8, 9, 11, 12
6.   Determinates Ex. 4.1   Question No. 2(i), 3, 5(ii), 6, 7(ii)
7.   Ex. 4.2   Question No. 5, 7, 9, 10(ii), 11(ii), 13, 14
8.   Ex. 4.3   Question No. 1(i), 2, 3, 4(i)
9.   Ex. 4.4   Question No. 1(i), 4, 5
10. Ex. 4.5   Question No. 3, 7, 10, 12, 14, 16, 18
11. Ex. 4.6   Question No. 1, 5, 8, 11, 12, 14, 15, 16
12. Misc. 4   Question No. 2, 3, 5, 6, 7, 8, 10, 12, 13, 15, 16, 17, 19
13. Chapter No. 5 Ex. 5.1   Question No. 1, 3, 5, 7, 9, 12, 16, 18, 23, 24, 26, 28, 30
14. Ex. 5.2   Question No. 1, 5, 8, 9, 10
15. Ex. 5.3   Question No. 2, 6, 10, 12, 14, 15
16. Ex. 5.4   Question No. 1, 3, 5, 6, 8, 10
17. Ex. 5.5   Question No. 1, 3, 6, 7, 10, 11, 13, 15
18. Ex. 5.6   Question No. 1, 3, 5, 7, 9, 10, 11
19. Ex. 5.7   Question No. 1, 3, 5, 7, 9, 11, 13, 15, 16, 17
20. Ex. 5.8   Question No. 1, 3, 4, 5
21. Misc.   Question No. 6, 9, 11, 13, 14, 15, 16, 17, 22, 23
22. Chapter No. 6 Ex. 6.1   Question No. 2, 3, 5, 7, 9, 10, 11, 14, 17
23. Ex. 6.2   Question No. 2, 5, 6(b, c, e), 8, 9, 14, 15, 16, 18
24. Ex. 6.3   Question No. 2, 4, 6, 7, 8, 11, 14(i, vi), 15, 16, 18, 19, 21, 22, 24, 26
25. Ex. 6.4   Question No. 1 (ii, vi, xi, xii, xiv, xv), 2, 3, 5, 6, 7, 8, 9
26. Ex. 6.5   Question No. 3 (i, v, vi, vii, viii), 5 (1, iii, iv),
                      7, 8, 10, 11, 12, 16, 17, 18, 21, 22, 24, 25, 26
27. Misc. Chapter No. 6   Question No. 2, 4, 5, 7, 8, 9, 10, 11, 12, 15, 18