# SCIENCE AND TECHNOLOGY

**CLASS: 10**                                                                                    **M.M. 75**

**General Instructions:**
1. The question paper consists of two sections, A and B. You are to attempt both the sections.
2. Marks allocated to every question are indicated against it.
3. Question no. 1- 5 in section A and 21 -23 in section B are to be answered in one word or one sentence.
4. Question no: 6-10 in section A and 24&25 in section B are to be answered in 30- 40 words each.
5. Question no: 11-17 in section A and 26 -29 in section B are to be answered in 40 to 50 words each.
6. Question no: 18- 20 in section A and 30 in section B are to be answered in 60- 80 words each.

## SECTION- A

Q.1 Define Solar constant.                                                                            (1M)

Q.2. $2NO_2 + O_2 \rightarrow 2NO_2$
   In the given reaction, what will happen to the rate of reaction when
   (i) 2 moles of Oxygen are taken (ii) 4 moles of NO are taken.                        (1M)

Q.3. At what position should an object be placed in front of a convex lens, so as to use it as a simple microscope?                                                                              (1M)

Q.4. Why is granulated zinc used in the laboratory preparation of $H_2$.                (1M)

Q.5. Give the molecular formula for the second member of the carboxylic acid series and the third member of the alcohol series.                                                    (1M)

Q.6. One gram of coal on complete combustion produces 30 KJ of energy. The chulha used for combustion has an efficiency of only 20%. If 5.6 g of coal is used to heat 'w' gms of water from 15° C-35° C, calculate the Value of 'w'.
   (specific heat of water – 4.2J/g/ °C.)                                                          (2M)

Q.7. (i) What was Arrhenius theory for acids and bases?
   (ii) A solution contains 0.05 moles of Hydrochloric acid in 2.5 liters of solution. Calculate the Molarity of the solution.

Q.8. Give any 4 applications of artificial satellites.                                          (2M)

Q.9. Explain giving equation, how ethanol is prepared from ethene.                   (2M)
                                          **OR**
   What is decarboxylation? Explain giving example.                                        (2M)

Q.10. A converging mirror forms a real image of height 4cms, of an object of height 1cm, placed 20cms away from the mirror.
         (i) At what distance should the screen be placed?
         (ii)What is the focal length of the converging mirror?                           (2M)

Q.11. (i) State two advantages of vulcanized rubber over natural rubber.
      (ii) Why is neo-prene non-inflammable?

(iii) Give any two points to suggest as to why detergent is advantageous when compared to soap. (3M)

Q.12. (i) What do you under stand by geostationary and sun synchronous satellites?
(ii) Differentiate Meteor and Meteorites.
(iii) What is differentiation? (3M)

Q.13. How will you carry out the following conversions. Give the equations and the essential conditions required ----
(i) ethanol to ethanal
(ii) ethanol to ethyl ethanoate
(iii) propanone to propan-2-ol (3M)

Q.14. (i) What is total internal reflection? Mention two conditions which should be satisfied for this phenomenon to occur.
(ii) Explain the subtractive production of green colour by a mixture of blue and yellow pigments.

**OR**

(i) What is critical angle of incidence? Show that $\sin i_c = 1/n_{12}$
(ii) What will be the colour of the red rose when placed in white light and blue light separately? Give your answer with reasons. (3M)

Q.15. (i) Why should the carbon-di-oxide gas be removed immediately during the production of lime?
(ii) What is chloride of lime? Give the equation for the preparation of this compound. Mention any one use of this compound.

**OR**

(i) How does tempering improve the quality of quenched steel?
(ii) What is slaking of lime? Give the equation for the process.
(iii) How does concrete differ from reinforced concrete? (3M)

Q.16. (i) How does the resistance of a wire change when
(a) Its length is doubled. (b) Its area is doubled.

(ii)
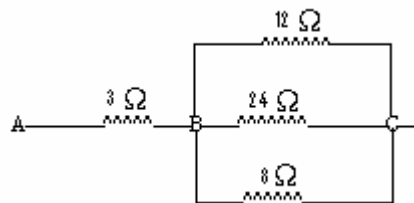


From the given figure, calculate the total resistance between

(a) B and C
(b) A and C (3M)

Q.17. (i) Why is limestone added during the extraction of iron? Explain giving equations.
(ii) Give two differenced between liquation and hydraulic washing. (3M)

Q.18. (i) Draw a labeled diagram of the boiling water type of nuclear reactor.

(ii) Give two differences between Nuclear fission and Nuclear fusion.　　(5M)


Q.19. (a) An element belonging to group 16 of the periodic table, having an
　　　　atomic number 16 and valency 2, 4, 6 has to be extracted.
　　　　　　(i) Identify the element and give the principle on which its extraction is
　　　　　　based.
　　　　　　(ii) Explain the process of extraction with the help of a neat labeled
　　　　　　diagram.

　　　(b) Name the promoters added in Haber's Process and give its role.

**OR**

　　In the extraction of Aluminium,
　　　　(i) What is the role of cryolite?
　　　　(ii)Why should the anode be replaced frequently?
　　　　(iii)Give a suitable labeled diagram to show this process.　　　　(5M)
Q.20. (i) With the help of a diagram, Explain the principle and working of an A.C.
　　　　　generator.
　　　(ii) What is a solenoid? State two ways by which you can increase the
　　　　　　magnetic strength in the solenoid.
**OR**
　　　　(i) State Fleming's Left Hand Rule. Explain an activity to show the relation
　　　　　illustrated by this rule. Draw a diagram to support your answer.
　　　　(ii) What is over loading and short – circuiting?　　　　(5M)




**SECTION—B**
Q.21.How many pairs of autosomes are there in human being.　　　　(1M)
Q.22.Name the protein digesting and starch digesting enzymes secreted by the
　　　pancreas.　　　　(1M)
Q.23.What are the excretory units in flat-worms and earth – worms called as. (1M)
Q.24.What is bio-accumulation? How does this affect our body?　　　(2M)
Q.25.Give two common features of all the respiratory organs like gills and lungs.
　　　　　　　　　　　　　　　　　　　　　　　　　　　(2M)
Q.26. (i) What is the difference between photoperiodism and phototropism.
　　　　(ii) Name the different lobes of the fore-brain and mention their functions
Q.27. (i) A person has been working in the ceramic industry for about 15 years.
　　　　What type of occupational disease is he prone to? What are the symptoms
　　　　of the disease?
　　　　(ii) Explain the following:
　　　　　a) Absorption b) Electrostatic precipitators c) Eutrophication.　　(3M)

Q.28. Explain any three types of evidences that supports evolution

**OR**

 (i) Justify the statement," Ontogeny recapitulates phylogeny".

  (ii) Give example of some reptiles where sex –determination is regulated by environmental factors.

   (iii) Which is the most accepted theory of evolution and what does it suggest about the origin of species?                                    (3M)

 Q.29. With the help of diagram explain the excretory system in the human being.
                                                                                   (3M)

 Q.30. (i) Explain how grafting is done in certain plants during vegetative propagation in plants.

        (ii) With the help of labeled diagram   explain double fertilization
          in plants.                                                      (5M).