FOUNDATION COURSE
CLASS IX

Time : 3 hrs. **PAPER : 01** **Max. Marks. : 90**

$P_{SS} C_S B_P$

TOPICS COVERED:

PHYSICS : SA-II Syllabus

CHEMISTRY : SA-II Syllabus

BIOLOGY : SA-II Syllabus

GENERAL INSTRUCTIONS :

1. Paper consists of **2 Sections** each for **Physics**, **Chemistry**, and **Biology**. Answers for each question should be given in the space provided in the question paper itself.
2. Section 'A' contains 24 questions, all questions are compulsory.
3. Section 'B' contains 18 questions, all questions are compulsory.
4. Section 'A' Questions 1 - 3 carry 1 Mark each.
5. Questions 4 - 7 carry 2 Marks each.
6. Questions 8 - 19 carry 3 Marks each.
7. Questions 20 - 24 carry 5 Marks each.
8. Section 'B' Questions 25 - 42 carry 1 Mark each.

Name of the Student :_____

Centre :_____

Invigilator's Signature:_____

SECTION - A

1. Calculate the formula unit mass of $CaCO_3$ (given atomic masses: Ca = 40. 0 u, C = 12 0 u, O = 16.0 u.
2. Write the name of the causal organism of leprosy.
3. Define biogeochemical cycle.
4. An object is suspended with a string. The string gets stretched. When the object is completely immersed in water the extension of thread decreases. Explain why it so happens.
5. What is the work to be done to increase the velocity of a car from 30 km/h to 40 km/h, if the mass of the car is 1500 kg ?
6. Give two differences between Phylum Protozoa and Phylum Porifera.
7. Define the following terms :

   (a) Vector (b) Hygiene
8. (a) Name the instrument used to determine purity of a sample of milk.

   (b) The volume of a 500 g sealed packet is 350 cm^3. Will the packet float or sink in water if the density of water is 1g/cm^3 ?
9. A porter lifts a box of mass 20 kg from the ground and loads it on the roof of a bus at a height 3m. Calculate the amount of work done by him if acceleration due to gravity be 10 m/s^2. What will be the power expended by the porter if he takes 10s to load the box.
10. State the law of conservation of energy. Show mathematically that energy of a ball of mass m falling freely from a height 'h' remains conserved at every point on its downward motion.
11. Define the term 'tone'. A person is listening to a sound of 500 Hz sitting at a distance of 450 m from the source of the sound. What is the time interval between successive compressions reaching his ears from the source.
12. The average atomic mass of a sample of an element 'X' is 16.2u. What is the percentage of each isotope $^{16}_{8}X$ and $^{18}_{8}X$ in the sample ?
13. (i) Write the names of the compounds represented by the following formulae:

    a) Na_2S b) KNO_3

    (ii) Write the chemical formulae of :

    a) Aluminum Chloride b) Magnesium oxide

    (iii) Find out the mass of 12.044×10^{23} atoms of magnesium (Given atomic mass of Mg = 24.0u)
14. Summarise the rules for writing distribution of electrons in various shells for Sulphur, Phosphorous and Chlorine.
15. Explain what are the different types of natural resources.
16. Write the name of the causal organism, symptoms, treatment and prevention of any one bacterial and any one protozoan disease.
17. Write any three structural characteristics of Bryophytes.
18. Explain the following "tissue specific and organ specific manifestation of disease".
19. Describe the process of nitrogen fixation.

20. (a) Justify that "a body at a greater height has larger energy".

(b) A body of mass 2 kg is thrown up at a velocity of 10 m/s. Find the kinetic energy of the body at the time of throw. Also, find the potential energy of the body at the highest point. The value of g = 10m/sec^2.

OR

(a) An object of mass m is moving with a constant velocity, v. How much work will be done on the object in order to bring the object to rest ?

(b) A 10 kg ball is thrown upward with a velocity of 5 m/s.

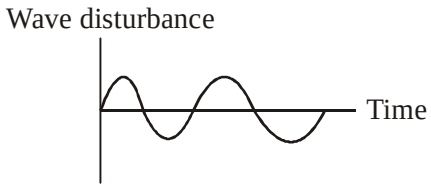
(i) Find its potential energy when it reaches the highest point.

(ii) Calculate the maxiumum height the ball reaches. (g = 10m/s^2).

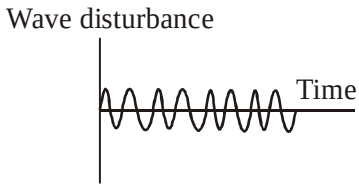
21. (a) List the parameters which characterise a sound wave.

(b) Given below are graphical wave shapes of two sound waves. Indentify the sounds which has (i) higher pitch (ii) higher loudness.
Give reason for your answer

(a)



(b)



(c) A sound wave has a frequency of 2 kHz and wavelength 35 cm. Find its velocity.

OR

(i) What is the audible range of the average human ear ?

(ii) Name two organisms producing sound in the infrasound range.

(iii) Define reverberation and mention two methods by which it is reduced in halls.

22. Give reason for the following
a) Isotopes of an element are chemically similar.
b) An atom is electrically neutral.
c) Noble gases show least reactivity.
d) Nucleus of an atom is heavy and positively charged.
e) Ions are more stable than atoms.

OR

(a) An ion M^{3+} has 10 electrons and 14 neutons. What is the atomic number and mass number of M ?

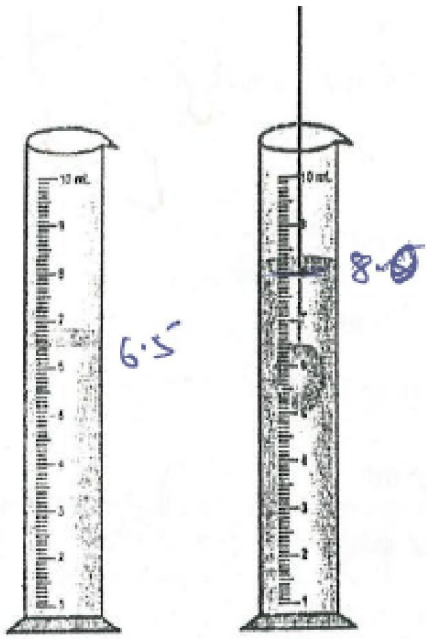
(b) A 0.24 g sample of compound of Oxygen and Boron was found by analysis to contain 0.096 g of Boron and 0.144 g of Oxygen. Calculate the percentage composition of the compound by weight.

23. Describe carbon cycle with proper diagrammatic representation.

24. Explain any three characteristic features of Phylum Annelida and any three characteristic features of Class Reptilia.

Section - B

25. The water level in a measuring cylinder, before and after immersing a metal cube in it, is shown in figure. The volume of the metal cube is



(a) 2.4 cm^3 (b) 1.5 cm^3 (c) 2.0 cm^3 (d) 1.8 cm^3

26. While determining the density of a solid sphere a student noted down the following readings :

(i) mass of the sphere = 64 g

(ii) reading of water level in the cylinder wihtout sphere in it = 62 ml

(iii) reading of water level in teh cylinder with sphere in it = 70 ml

On the basis of these observations, what should be the density of solid ?

(a) (64/62) g/ml (b) (64/70) g/ml (c) (64/8) g/ml (d) (62/64) g/ml

27. Monu was provided with a sphere of weight 0.5N and four measuring cylinders A, B, C, D each containing 100 mL of tap water. He mixed 15g, 50g and 75g of salt respectively in cylinders B, C, D. He then measured the weight of sphere by immersing it in A, B, C, D successively. He would find that maximum loss in weight occurs in

(a) A (b) B (c) C (d) D

28. When a body is immersed in a liquid, the value of buoyant force acting on the body depends on

(a) density of substance of which body is made (b) density of liquid in which it is immersed

(c) mass of body (d) volume of the liquid taken for immersing it

29. Nimmi measured the face areas of three faces f_1, f_2, f_3 of a brick to be 200 sq cm, 120 sq cm and 60 sq cm, respectively. the weight of the brick is 10N. How should she place the brick on its face on sand so that it goes into sand up to a maximum depth

(a) by placing it on face f_1 (b) by placing it on face f_2

(c) by placing it on face f_3 (d) by placing it on any face f_1 or f_2 or f_3

30. After measuring pressure exerted by a cuboid on sand, Rita wanted to show her result to the teacher. But she is confused about the unit in which pressure is expressed. The correct choice would be

(a) N-m (b) Nm^{-1} (c) Nm^2 (d) Nm^{-2}

31. While verifying the laws of reflection of sound, a student measured the angle between the incident sound wave and reflected sound wave to be 120°. The angle of incidence is

(a) 100° (b) 60° (c) 120° (d) 50°

32. For reflection of sound wave, we need

(a) a polished and smooth surface (b) hard surface only

(c) a polished and rough surface (d) both (b) and (c) only

33. A pulse produced in a slinky travels from its one end to the other and then back to the first one in 12m long slinky in 4.8s. The velocity of the pulse is

(a) 2.5 ms^{-1} (b) 4 ms^{-1} (c) 55.6 sm^{-1} (d) 5 ms^{-1}

34. In a slinky one can produce

(i) only crest (ii) only trough (iii) crest and trough (iv) compression and rarefaction

The correct answer will be

(a) i, ii (b) i, iv (c) ii, iv (d) iii, iv

35. In accordance with the law of conservation of mass, give the co-efficient of O_2 in the equation

$C_5H_{12} + O_2 \rightarrow 5CO_2 + 6H_2O$

(a) 4 (b) 6 (c) 8 (d) 2

36. Rate of diffusion is the fastest in

(a) Solids (b) Liquids (c) Gases (d) None of thsse

37. Which among the following is the first group of vascular plants with conducting tissues, xylem and phloem ?

(a) Bryophyta (b) Angiospermae (c) Gymnospermae (d) Pteridophyta

38. Liver inflammation, vomiting, jaundice are the symptoms of

(a) Amoebic dysentery (b) Hepatitis B (c) Mumps (d) Syphilis

39. Role of bacteria in carbon cycle is

(a) Photosynthesis (b) Chemosynthesis

(c) Breakdown of organic compounds (d) Assimilation of nitrogenous compounds

40. Nitrates are transformed into nitrogen by

(a) Ammonifying bacteria (b) Nitrifying bacteria

(c) Denitrifying bacteria (d) Nitrogen-fixing bacteria

41. Vertebrates are characterised by

(i) The presence of true coelom (ii) The presence of notochord

(iii) The presence of canal system (iv) The presence of pharyngeal gill slits at some stage of life cycle

(v) The presence of RBC's

(a) (i) is correct (b) (ii) is correct

(c) (i), (ii) and (iv) are correct (d) (i) and (iii) are correct

42. Chickenpox is caused by

(a) Varicella Zoster virus (b) Lentivirus

(c) Ribulavirus (d) Enterovirus

FOUNDATION COURSE
CLASS X

Time : 3 hrs. **PAPER : 01** **Max. Marks. : 90**

$P_S C_S B_M$

TOPICS COVERED:

PHYSICS : SA-II Syllabus

CHEMISTRY : SA-II Syllabus

BIOLOGY : SA-II Syllabus

GENERAL INSTRUCTIONS :

1. Paper consists of **2 Sections** each for **Physics**, **Chemistry**, and **Biology**. Answers for each question should be given in the space provided in the question paper itself.
2. Section 'A' contains 24 questions, all questions are compulsory.
3. Section 'B' contains 18 questions, all questions are compulsory.
4. Section 'A' Questions 1 - 3 carry 1 Mark each.
5. Question Questions 4 - 7 carry 2 Marks each.
6. Question Questions 8 - 19 carry 3 Marks each.
7. Question Questions 20 - 24 carry 5 Marks each.
8. Section 'B' Questions 25 - 42 carry 1 Mark each.

Name of the Student :_____

Centre :_____

Invigilator's Signature:_____

SECTION - A

1. Define food chain.
2. Draw the electron-dot structure of ethane molecule (C_2H_6).
3. Name two main abiotic factors, which affect human environment.
4. When two lenses of focal length +10 cm and -5 cm are placed in contact, then find the net power.
5. Draw a well labelled diagram of human male reproduction system
6. Write a note on the management of natural resources.
7. "Genes and chromosomes have similar behaviour" Justify.
8. Draw a ray diagram to show the image of an object placed between f and 2 f of a thin convex lens.
9. Where should an object be placed from a converging lens of focal length 20 cm, so as to obtain a real image of magnification 2 ?
10. Explain the role played by:

    (a) iris (b) pupil (c) cornea (d) retina
11. What is saponification ? Explain the cleansing action of soap.
12. How would the following properties of the element vary along the period from left to right in the modern periodic table. Give reasons in each case.

    (a) Tendency to lose electrons (b) Atomic size

    (c) Valency
13. (a) Name the compound formed on heating ethanol at 443K with excess of conc. H_2SO_4. Give mechanism (steps) of the reaction

    (b) Describe a chemical test to distinguish between ethanol and ethanoic acid
14. (a) What are fossils ?

    (b) A child finds a fossil of a leaf. List and describe two ways to decide how long ago the leaf was part of a living tree.
15. Define homologous series of organic compounds. Mention any two characteristics of homologous series.
16. Fertilization is possible if ovulation has taken place during middle of the menstrual cycle. Give reason.
17. What is the importance of DNA copying in reproduction?
18. Describe surgical method of birth control.
19. Draw a schematic diagram to explain the independent inheritance of two separate traits, shape and colour of seeds.
20. (a) How do harmful chemicals enter food chain?

    (b) "Economic growth and ecological conservation should go hand in hand." Explain why?
21. (a) How can you distinguish between a plane mirror, a convex mirror and a concave mirror, just by looking at the image formed by them.

    (b) The lens prescribed by the doctor has a power equal to +2.0 D. What does it mean?

    (c) What would be the approximate focal length of a spherical lens preferred to use while reading small letters found in a dictionary?

22. What is refraction? Write the basic laws of refraction. What happens to the frequency, velocity and wavelength as light moves from one medium to another? Based on the bending in refraction, how can you identify the nature of the medium?

23. (a) Complete the following equations :

(i) $CH_4 + \underset{\text{(Excess)}}{O_2} \rightarrow$

(ii) $CH_3COOH + C_2H_5OH \xrightarrow{\text{Acid}}$

(iii) $CH_3COOH + NaOH \rightarrow$

(b) Write the IUPAC name of the next homologue of (i) CH_3OH, (ii) $CH_2 = CH_2$

24. Give salient features of Darwin's theory of natural selection.

SECTION - B

25. Three students measured the focal length of a convex lens using parallel rays from a distant object.

All of them measured the distance between the lens and the inverted image on the screen.

Student A saw a sharp image on the screen and labelled the distance as f_1 .

Student B saw a slightly larger blurred image on the screen and labelled the distance as f_2 .

Student C saw a slightly smaller blurred image on the screen and labelled the distance as f_3 .

The relation between the three measurements would most likely:

(a) $f_1 = f_2 = f_3$ (b) $f_1 < f_2$ and f_3 (c) $f_3 < f_1 < f_2$ (d) $f_1 < f_2$ and $f_1 = f_3$

26. A student sitting on the last bench, can read the letters written on the black board but is not able to read the letters written in his text book. Which is the following statement regarding the above condition is correct:

(a) The near point of his eyes has receded away.

(b) The near point of his eyes has come closer to him.

(c) The far point of his eyes has come closer to him.

(d) The far point of his eye has receded away.

27. 'Chipko Andolan' was launched for the protection of:

(a) grasslands (b) forests (c) livestock (d) wetlands

28. A student carries out the experiment of tracing the path of a ray of light through a rectangular glass slab, for two different values of angle of incident : $\angle i = 30°$ and $\angle i = 40°$. these set of values of angle of refraction $(\angle r)$ and the angle of emergence $(\angle e)$, she is likely to observe in the two cass, are :

(a) $[\angle r = 30°, \angle e = 20°]$ and $[\angle r = 45°, \angle e = 28°]$

(b) $[\angle r = 20°, \angle e = 30°]$ and $[\angle r = 45°, \angle e = 28°]$

(c) $[\angle r = 20°, \angle e = 30°]$ and $[\angle r = 28°, \angle e = 40°]$

(d) $[\angle r = 30°, \angle e = 20°]$ and $[\angle r = 28°, \angle e = 45°]$

29. Which one of the following sets of materials represents the minimum materials required for determining the focal length of a convex lens by obtaining an image of a distant object :

(a) Set A – A convex lens, a lens holder, a secreen with stand, a measuring scale

(b) Set B – A candle, a match box, a convex lens, a lens holder, a screen with stand

(c) Set C – A lens holder, a convex lens, a measuring lens, a screen with stand

(d) Set D – A convex lens, a buring candle, a screen with stand, a lens holder

30. A piece of granulated zinc was dropped into copper sulphate solution. After some time, the colour of the solution was changed from

(a) light green to blue (b) blue to colourless

(c) light green to colourless (d) blue to yellow

31. Common salt besides being used in kitchen can also be used as a raw material for making of:

(i) washing soda (ii) bleaching powder (iii) baking soda (iv) slaked lime

(a) (i) and (ii) (b) (i), (ii) and (iv) (c) (i) and (iii) (d) (i), (iii) and (iv)

32. Which of the following oxide(s) of iron would be obtained on prolonged reaction of iron with steam?

(a) FeO (b) Fe_2O_3 (c) Fe_3O_4 (d) Fe_2O_3 and Fe_3O_4

33. When the stopper of a bottle containing a colourless liquid was removed, the bottle gave out a smell like that of vinegar. The liquid in the bottle could be:

(a) hydrochloric acid solution (b) sodium hydroxide solution

(c) acetic acid solution (d) saturated sodium hydrogen carbonate solution

34. Acetic acid was added to a solid 'X' kept in a test tube. A colourless and odourless gas 'Y' was evolved. The gas was passed through lime water which turned milky. It was concluded that:

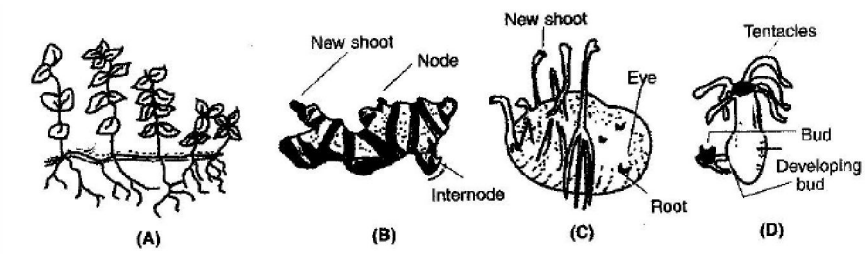
(a) solid X is sodium hydroxide and the gas Y is CO_2

(b) solid X is sodium carbonate and the gas Y is CO_2

(c) solid X is sodium acetate and the gas Y is CO_2

(d) solid X is sodium hydrogen carbonate and the gas Y is SO_2

35. Which one of the following does not show a vegetative propagation ?



36. In binary fission:

(a) The identity of parent body is maintained after reproduction.

(b) The parent body is lost after reproduction.

(c) The parent body enlarges.

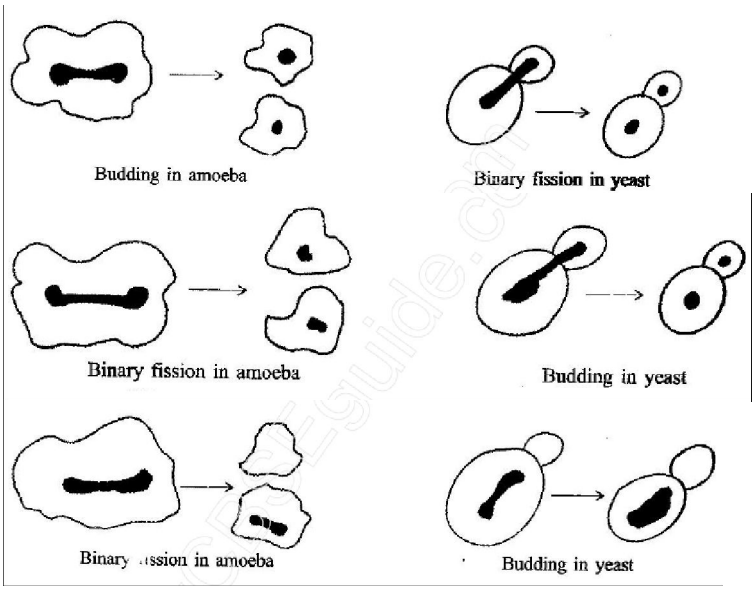
(d) None of these.

37. The method of multiplication in the species without seeds:

(a) Binary fission (b) Budding

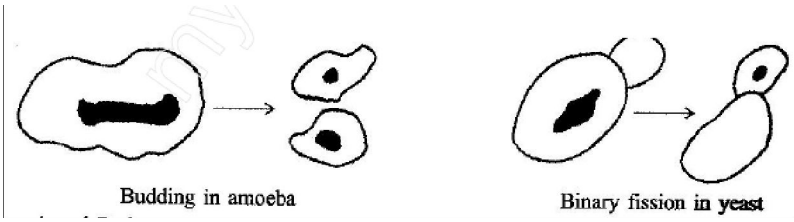
(c) Vegetative propagation (d) Multiple fission

38. Which one out of the following sets of diagrams correctly depicts reproduction in *Amoeba* and yeast:

(a) 

(b)

(c)

(d) 

39. A concave lens of suitable focal length is used for correcting a-

(a) Myopic eye (b) Hypermetropic eye (c) Both a and b (d) nor a nor b

40. Which colour suffers least deviation on passing through a prism?

(a) Red (b) Violet (c) Indigo (d) Blue

41. Cinematography makes use of -

(a) Accommodation (b) Persistence of vision

(c) Least distance of distinct vision (d) Bi-focal lens system

42. Two lenses of power –1.75D and +2.75D are placed in contact. The focal length of the combination is :-

(a) 50cm (b) 100cm (c) 75cm (d) 125cm

FOUNDATION COURSE
CLASS IX
PAPER : 01

Time : 3 hrs. **Max. Marks. : 90**

M_M

TOPICS COVERED:

MATHEMATICS : SA-II Syllabus

GENERAL INSTRUCTIONS :

1. *All the questions are compulsory.*
2. *The paper consists of 34 questions divided into four section A, B, C and D.*
3. *(i) Section A contains 08 MCQs of 1 marks each.*
   (ii) Section B contains 06 questions of 2 marks each.
   (iii) Section C contains 10 questions of 3 marks each.
   (iv) Section D contains 10 questions of 4 marks.
4. *Use of calculator is not permitted.*

Name of the Student :_____

Centre :_____

Invigilator's Signature :_____

SECTION-A

1. The mean of first five whole numbers is

   (a) 3 (b) 2 (c) 2.5 (d) None of these

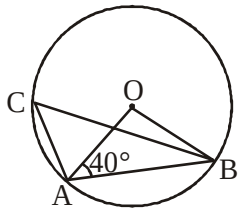
2. Which one is a cyclic quddirateral

   (a) Rhombus (b) Parallelogram (c) Isosceles trapezium (d) All of the above

3. In a survey of 364 children aged 19-36 months, it was found that 91 liked to eat potato chips. If a child is selected at random, the probability that she/he does not like to eat chips is

   (a) 0.25 (b) 0.50 (c) 0.75 (d) 0.80

4. In figure, if $\angle OAB = 40°$, then $\angle ACB$ is equal to;



   (a) 50° (b) 40° (c) 80° (d) 100°

5. The ratio of volume to surface area of a sphere of diameter d is

   (a) d : 3 (b) d : 6 (c) 2d : 3 (d) 4d : 3

6. ABCD is a rhombus with $\angle ABC = 40°$. The measure of $\angle ACD$ is

   (a) 90° (b) 20° (c) 40° (d) 70°

7. The distance of a chord of length 16 cm from the centre of the circle of radius 10 cm is

   (a) 6 cm (b) 8 cm (c) 10 cm (d) 12 cm

8. The the diameter of base of a cone is 8cm and its height is 3cm, the curved surface area of cone is

   (a) 20π cm^2 (b) 30π cm^2 (c) 24π cm^2 (d) 32.8π cm^2

SECTION - B

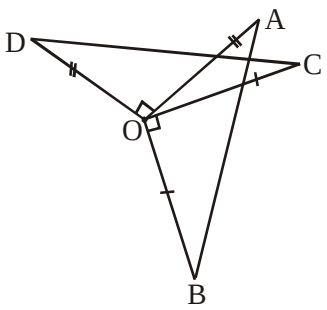
9. The mean of numbers a, b, c, d, e is 10. If each number gets multiplied by 5, then new mean is

10. Construct an angle of 75°.

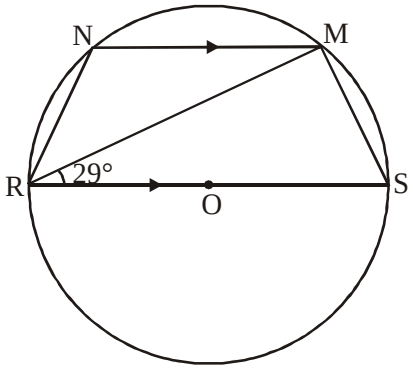
11. Find two solutions for each of following equations

    (a) $4x + 3y = 12$ (b) $2x + 5y = 0$

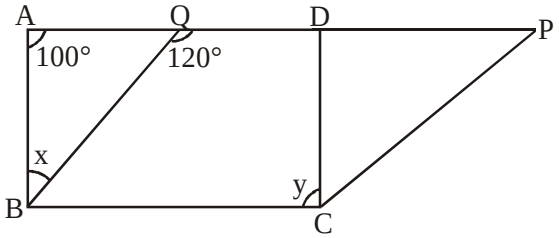
12. In figure, $OA \perp OD, OC \perp OB, OD = OA$ and OC = OB. Prove that AB = CD.



13. In figure, RS is a diameter of the circle with centre O. NM is parallel to RS and $\angle MRS = 29°$. Find $\angle RNM$.

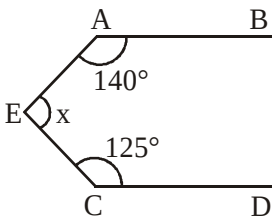


14. In figure, BCPQ and BCDA are two parallelograms on the same base BC. The value of (x + y) is

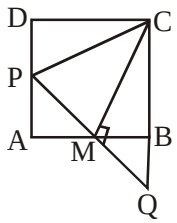


SECTION - C

15. If D, E, F are mid points of sides AB, BC and CA respectively of ΔABC, then prove that $2 \text{ ar } (\Delta DEF) = \frac{1}{2} \text{ ar } (\Delta ABC)$.
16. The total surface area of a cube is 486 cm^2. Find its volume.
17. The mean of 100 observations is 50. If the observation 50 is replaced by 150, what will be the resulting mean ?
18. The median of the following observations arranged in ascending order is 24. Find the value of x.
    11, 12, 14, 18, x + 2, x + 4, 30, 32, 35, 41.
19. O is any point on the diagonal BD of the parallelogram ABCD. Prove that ar(ΔOAB) = ar (ΔOBC).
20. Draw the graph of x + y = 5 and 2x + 2y = 12 on the same axes. What does the graph of these lines represent.
21. In the figure, AB||CD. Find x.



22. In figure, ABCD is square. M is the mid-point of side AB and PQ ⊥ CM meets AD at P and CB produced at Q.

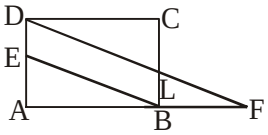


Prove that

(i) ΔPAM ≅ ΔQBM

(ii) CP = CQ.

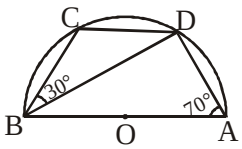
23. In figure, ABCD is a parallelogram in which E is the mid-point of AD. DF||EB, meeting AB produced in F and BC at L. Prove that DF = 2DL.



24. Two circles with centres O and O´ intersect at two points A and B. line PQ is drawn parallel to OO´ through A (or B) intersecting the circles at P and Q. Prove that PQ = 2OO´.

SECTION - D

25. In figure, C and D are two points on the semicircle described on AB as diameter. If $\angle BAD = 70°$ and $\angle DBXC = 30°$, find $\angle BCD$ and $\angle BDC$.



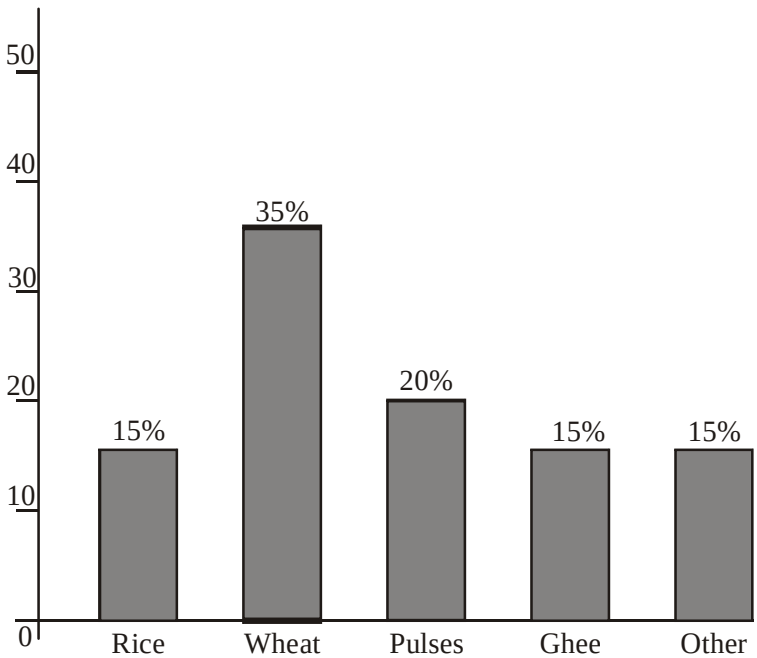
26. The difference between the outside and inside surfaces of a cylindrical pipe 14cm in length is 44cm^2. Find the thickness of the pipe.

27. A sphere, a cylinder and a cone have the same radii. The height of the cylinder and the cone is equal to the diameter of the sphere. Find ratio of their respective volumes.

28. The distribution of expenditure of a family on food items is given in the following bar chart. Read the bar chart and answer the following questions :

(i) What is the percentage of excess expenditure on wheat than that on pulses ?

(ii) What is the total percentage expenditure on pulses and ghee ?



29. Prove that in a triangle, the line joining mid points of any two sides is parallel to the third side, and equal to half of the length of that side.

30. Following table gives the distribution of the marks obtained by the students of a class.

Marks	0 - 15	15 - 30	30 - 45	46 - 60	60 - 75	75 - 90
Number of Students	5	12	28	30	35	13

Represent the data by frequency polygon.

31. Construct a triangle ABC, on whose perimeter is 15 cm and two of its angles are 90° and 60°.

32. The radius and height of a cylinder are in the ratio 2 : 3. If the volume of the cylinder is 1617 cm^3, find the radius of base of the cylinder and total surface area of cylinder.

33. Bulbs are packed in cartons each containg 40 bulbs. Seven hundred cartons were examined for defective bulbs and the result are given in the following table :

Number of defective bulbs	0	1	2	3	4	5	6	More than 6
Frequency	400	180	48	41	18	8	3	2

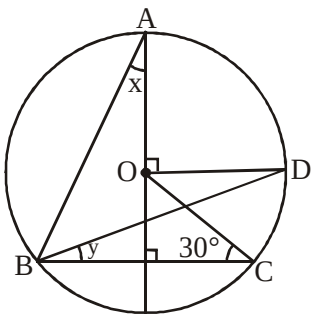
One carton was selected at random. What is the probability that it has

(i) no defective bulb

(ii) defective bulbs from 2 to 6

(iii) defective bulbs less than 4

34. In figure, O is the centre of the circle, $\angle BCO = 30°$ find x and y.



FOUNDATION COURSE
CLASS X
PAPER : 01

Time : 3 hrs. **Max. Marks. : 90**

M_B

TOPICS COVERED:

MATHEMATICS : SA-II Syllabus

GENERAL INSTRUCTIONS :

1. *All the questions are compulsory.*
2. *The paper consists of 34 questions divided into four section A, B, C and D.*
3. *(i) Section A contains 08 MCQs of 1 marks each.*
   (ii) Section B contains 06 questions of 2 marks each.
   (iii) Section C contains 10 questions of 3 marks each.
   (iv) Section D contains 10 questions of 4 marks.
4. *Use of calculator is not permitted.*

Name of the Student :_____

Centre :_____

Invigilator's Signature :_____

SECTION-A

1. The sum of the roots of the equation $3x^2 - (3k - 2)x - (k - 6) = 0$ is equal to the product of its roots, then the value of k is

   (a) 1 (b) –1 (c) 0 (d) 2

2. The perimeter of the triangle formed by the points (0, 0), (1, 0), (0, 1) is

   (a) $1+\sqrt{2}$ (b) $\sqrt{2}+1$ (c) 3 (d) $2+\sqrt{2}$

3. The probability of guessing the correct answer to certain question is P/12, if the probability of not guessing the correct answer to the same question is 3/4 then the value of P is

   (a) 4 (b) 2 (c) 3 (d) 1

4. If p(–1, 1) is the midpoint of the line segment joining A(–3, –6) and B(1, b + 4), then b is

   (a) 1 (b) –1 (c) 2 (d) 4

5. The area of two circle are in the ratio 4 : 9, the ratio of their circumference is

   (a) 2 : 3 (b) 3 : 2 (c) 4 : 9 (d) 9 : 4

6. The number of two digits that are divisible by 6 is

   (a) 12 (b) 16 (c) 15 (d) 18

7. The angle of depression of an object from a 60 m high tower is 30°. The distance of the object from the tower is

   (a) $20\sqrt{3}$ m (b) $60\sqrt{3}$ m (c) $40\sqrt{3}$ m (d) 120 m

8. A solid metal cone with radius of base 12 cm and height 24 cm is melted to form solid spherical balls of diameter 6 cm each. The number of balls formed is

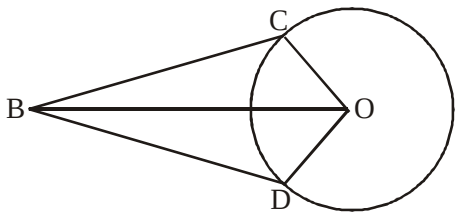
   (a) 16 (b) 24 (c) 32 (d) 28

SECTION-B

9. If the roots of the equation $(a - b)x^2 + (b - c)x + (c - a) = 0$ are equal, Prove that b + c = 2a.

10. If (2p + 1), 13, (5p – 3) are three consecutive terms of an A.P. what is the value of p.

11. Two tangents BC and BD are drawn to a circle with centre O such that $\angle CBD = 120°$. Prove that OB = 2 BC.



12. A quadrilateral ABCD is drawn to circumscribe a circle, Prove that AB + CD = AD + BC.

13. Find the distance between the points (5 sin 60, 0) and (0, 5 sin 30).

14. If tangents AB and AC from a point A to a circle with centre O are inclined to each other at an angle of 70°, then find $\angle AOB$.

SECTION-C

15. Find two consecutive positive integers, the sum of whose squares is 25.

16. If 10 times the 10th term of an A.P. is equal to 15 times the 15th term, show that its 25th term is zero.

    (i) What is the relation between first term 'a' and common difference 'd'.

    (ii) Prateek declares that 25th term of the A.P. is non zero, do you agree ? Which value of Prateek is depicted by his declaration.

17. A 1.5 m tall boy stands at a distance of 3m from a lamp post and cast a shadow of 4.5 m on the ground. Find the height of the lamp post.

18. The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3, Find the height of the pillar.

19. The line segment joining the points A(3, 2), B(5, 1) is divided at the point P in the ratio of 1 : 2 and P lies on the line $3x - 18y + k = 0$, Find the value of k ?

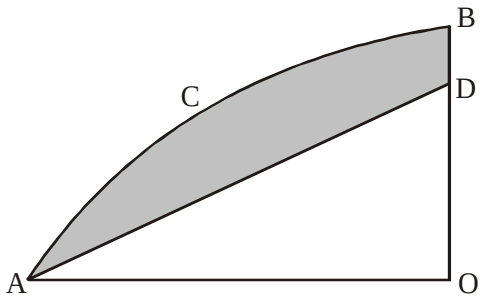
20. Draw a circle of radius 4.2 cm. Draw a pair of tangents to this circle inclined to each other at an angle 50°.

21. For what value of P for which the points (–5, 1), (1, P) and (4, –2) collinear.

22. A bag contains 6 red balls and some blue balls. If the probability of drawing blue ball from the bag is twice the probability of drawing a red ball, Find the number of blue balls.

23. If the radii of the ends of a buckets are 5 cm and 15 cm. It is 24 cm high. Find its surface area. It is known that the bucket is open at the bigger end. ($\pi = 3.14$).

24. OACB is a quadrant of a circle with centre O and its radius 3.5 cm. If OD = 2 cm, find the area of



    (i) Quadrant OACB

    (ii) Shaded region

    (take $\pi = 22/7$)

SECTION-D

25. The sum of the area of two squares is 640 m^2. If the difference in their perimeter is 64 m, Find the sides of the two squares.

26. Find the sum of first 25 terms of an A.P. whose n^{th} term is given by $a_n = 7 - 3n$.

27. Prove that the tangents drawn from an external point of a circle are equal.

28. The angle of elevation of jet fighter from a point A on the ground is 60°. After a flight of 15 seconds, the angle of elevation changes to 30°. If the jet is flying at a constant height of $1500\sqrt{3}$m find

    (i) The horizontal distance between the two positions of the jet plane.

    (ii) the speed of the jet plane in km/h

    (iii) Hari guesses that the speed of the jet plane is 720 km/h, how do you appreciate his guess, What is the value you have learnt from his guess ?

29. A spheres of diameter 6 cm is dropped in a right circular cylindrical vessel, partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel.

30. In what ratio, the line segment joining the points A(–6, 3) and B(–2, –5) is divided by the y axis. Also find the co-ordinates of the point of division.

31. A bag contains 11, 12, 13, 14 ..... 30 tickets. A ticket is taken out from the bag at random. Find the probability that number on the drawn ticket is

(a) Multiple of 7

(b) Greater than 15 and a multiple of 5.

32. The area of an equilateral triangle is $49\sqrt{3}\ cm^2$. Taking each angular point as centre, circles are drawn with radius equal to half the length of the side of the triangle. Find the area of the triangle not included in the circles. $(\sqrt{3} = 1.73, \pi = 22/7)$.

33. A toy in the form of a cone mounted on a hemisphere of common base radius 7 cm. The total height of the toy is 31 cm,

(i) Find the slant height of the conical part

(ii) Write the formulas used in this solution

(iii) Find the total surface area of the toy

(iv) David says that the height of the conical portion is an even number, is he true ? Which value is seen by his statement ?

34. A circle touches the sides BC of a ΔABC at P and touches AB and AC produced at Q and R as shown in the figure, Show that AQ = 1/2 (perimeter of ΔABC).