SAT Exam Sample Paper-2011

Time: 3 Hours Max.Marks: 180

NOTE:-

1. Attempt all questions. There is no negative marking. No additional sheets are provided

2. Answer all the questions of the same subject at one place.

3. Students may take around 80 minutes for Mathematics, 50 minutes for Physics and 50 minutes for Chemistry.

4. Use of calculators, slide rule, graph paper and logarithmic, trigonometric and statistical tables is not permitted.

PART-A : MATHEMATICS

Note:- All answers to questions in Section-A, Section-B and Section-C must be supported by

mathematical arguments. In each of these sections order of the questions must be maintained.

SECTION-A

This section has Five Questions. Each question is provided with 5 alternative answers. One or more than one

of them are correct answers. Indicate the correct answer by A, B, C, D, E. (4x3=12 MARKS)

1. If 2011 is written as the sum of 11 consecutive primes in their ascending order, then the 6th prime is

A) 167 B) 187 C) 181 D) 211 E) 183

2. In a triangle ABC, D is the mid point of BC and AD > BC/2. Then A is

A) <900 B) <1200 C) <1350 D) <600 E) <450

3. Let l be a fixed line. ABCD be a square having a fixed side length, moving such that its vertex D is at a

fixed point on the line l and such that the square is on one side of the line l. Let A', C' be the feet of the

perpendiculars of A and C on l respectively. Then □AA'D and □DC'C are congruent if angle BDA' =

A) 300 B) 450 C) 900 D) 600 E) none of these

4. If x<y and x+y = k then

A) x < k/2 only when k>0 B) y> k/2 only when k> 0 C) x < k/2

D) y > k/2 E) x < k/2 when k>0 and x> k/2 when k < 0

SECTION-B

This section has Five Questions. In each question a blank is left. Fill in the blank. (4x3=12 MARKS)

5. In the sequence obtained by omitting the perfect squares from the sequence of natural numbers, 2011th

term is _____

6. In a plane, given any three non collinear points, the number of parallelograms that can be formed such

that the three given points become three consecutive vertices is _____

7. A certain integer has only two distinct prime factors. The number of its divisors is 6, and the sum of the

divisors is 28. The integer is_____

8. The value of 2log6 18.3log6 3 in decimal form is _____

SECTION-C

State True or False in each of the following statements. (4x3=12 MARKS)

9. 201164 + 64 is a composite number.

10. There exist four distinct points A, B, C, D in a plane such that AD ⊥ BC and BD ⊥ CA.

11. There exist a pair of non negative real numbers a, b such that (a - b)(a(a+b) - 2b2) is negative.

12. If n is a natural number, 2n+1 and 3n+1 are squares then 5n+3 is not a prime.

SECTION-D (4x6=24 MARKS)

13. If [x] represents the greatest integer less than or equal to x then solve the equation

x2011 – [x]2011 = (x – [x])2011 in positive real numbers.

14. Find all possible ordered triads (a, b, c) such that (n+3)2 = a(n+2)2 + b(n+1)2 + cn2 for every positive

integer n.

15. State and Prove Alternate Segment Theorem on circles.

16. Write any two functions f: R → R such that f(x) = f(x/2) for every real number x.

PART-B : PHYSICS

(10x6=60 Marks)

17.Two bodies of equal volume connected by a string are floating with one of them completely submerged

and the other with half of its volume outside the liquid as in the figure (Below, Left). Find the densities

of the materials of the bodies if the densities are in the ratio 1:3. If the volume of the floating body is

doubled, find the fraction of the floating body that now lies submerged in the liquid.(Density of liquid =

800 kgm-3)

18.An insect crawls along the sides of a regular hexagon (Above, Right) with a uniform speed v in the anticlockwise sense. find the magnitude of its average velocity in moving from (i) A to C and (ii) A to D and (iii) A to E

19.Two parallel rays of light separated by ‘d’ (Below, Left) are incident at the boundary of air and a medium of refractive index √2 at 45°. Find the angle of deviation of each ray and the distance between these rays in the medium

20.A wire of resistance R is bent in the form of a circle and is connected to a 220 V source as shown (Above, Right). If the energy provided by the source in 42 s is same as the energy required to raise the temperature of 11 kg of water through 44 C°, find the value of R.

21.Resistances of 2 Ω and 3Ω are connected in series between terminals A and B, and a potential difference of 20 V is applied between the terminals. An unknown resistance is connected in parallel to the 3 Ω resistance and the current in this unknown resistance is 5/12 times the current that was flowing from A to B before it was connected. Find the unknown resistance.

22.A long conductor carries a current northward. A moving positively charged particle is located vertically below the conductor. Find the force acting on it if its velocity is directed (i) downward (ii) westward

23.Rate at which energy is incident on 1 m2 area facing the sun is 1400 W. The average area of the roof top of a moderate home is 150 m2. Since the angle of incidence of the energy from sun on the roof top varies during the day, the average rate for a 12 hour duration is half of the maximum rate of incidence at the noon time. Find the energy received in 12 hour duration by the roof of the building. Assuming yield of 200 MeV per reaction in the fission of uranium nucleus, find the number of reactions that produce the same amount of energy as provided by the sun to the roof in the 12 hour duration.

Questions 24 to 26 are based on the following physical situation.

A stream of particles each of mass 1 g moving horizontally with a velocity of 5 m/s strike a vertical wall.

The particles stick to the wall after hitting the wall. Number of particles per m3 of the stream is 10000.

24. Find the number of particles striking a square area of side 50 cm of the wall in one second.

25. Find the number of particles of the stream that cross a vertical section of area 0.4 m2 in two seconds

26.The change in momentum of the particles that strike an area 2 m2 of the wall in four seconds.

d

air

medium μ =√2

45°

F

A B

C

E D

220 V

90°

PART-C : CHEMISTRY

(15x4=60 Marks)

27. Ferrous sulphate is treated with potassium permanganate in the presence of suphuric acid. Potassium

sulphate, manganese sulphate, ferric sulphate are the products of the reaction. The number of moles of

sulphuric acid required for 1 mole of KMnO4 ____.

28. Amongst the following the total number of compounds whose aqueous solution turns red litmus paper

blue is ___.

KCN , K2SO4 , NaCl , Zn(NO3)2 , FeCl3 , K2CO3 , NH4NO3 , LiCN

29. The value of n in the molecular formula BenAl2Si6O18 is ___

30. Total number of diprotic acids among the following is ___

H3PO4 , H2SO4 , H3PO3 , H2CO3 , H2S2O7 , H3BO3 , H3PO2 , H2CrO4 , H2SO3

31. Among the following the number of elements showing only one non-zero oxidation state ___

O , Cl , F , N , P , Sn , Tl , Na , Ti

32. Iron (II) sulphide is heated in air to form compound A, and an oxide of sulphur. The oxide of sulphur is

dissolved in water to give an acid. The basicity of this acid is ___.

33. A current of 10 A flows for 2 hours through an electrolytic cell containing a molten salt of metal X and

results in the deposition of 0.25 moles of metal X at cathode. The oxidation state X in the electrolysed

salt is ____ .

34. Ar and He are both gases at room temperature. The average velocity of He atom is x times of average

molecular velocity Ar atoms at this temperature. The numerical value of x is ___.

(atomic wt of Ar = 36, He = 4)

35. Among BF3 , NF3, pH3, IF3, IF5 and SF4 the number of species having the same number of loan pair

of electrons on central atom is ____

36. On heating 1.763g of hydrated BaCl2 to dryness 1.505g of anhydrous salt remained. Number of moles

of H2O present in the mole of hydrated BaCl2 is ____ (mol.wt. of anhydrous BaCl2 is 208)

37. Dry air contains at one atmosphere pressure contains 78% nitrogen 21% oxygen and 1% other gases.

The partial pressure of other gases is ax10-2 atm where a is ___.

38. The bond energy of an O-H bond is 109 k.cal mole-1. When 5x10-3 mole of water is formed, the energy

released in k.cal is ____.

39. On decomposition of NH4HS the following equation is established NH4HS(s) NH3(g)+H2S(g)

If the total pressure is p atmospheres then the equilibrium constant Kp will be equal to

x

p2

atm2 where x

is ___

40. 10 ml of pure ethyl alcohol of density 0.785g ml was diluted with water to a final value of 100 ml. The

density of resulting solution was 0.9866 g/ml. Percentage by weight of ethyl alcohol is ___.

41. Match the following

Column - I Column - II

A) 0.55 mole p) 4.48 lit of SO_2 at NTP

B) 0.10 mole q) 100 ml of H_2O

C) 0.20 mole r) 22g of CO_2

D) 0.50 mole s) 2.24 lit. NH_3

t) 0.1 g atom of Iron

SAT Exam Sample Papers-2012

Time: 3 Hours Max.Marks: 180

NOTE:-

1. Attempt all questions. There is no negative marking. No additional sheets are provided

2. Answer all the questions of the same subject at one place.

3. Students may take around 80 minutes for Mathematics, 50 minutes for Physics and 50 minutes for Chemistry.

4. Use of calculators, slide rule, graph paper and logarithmic, trigonometric and statistical tables is not permitted.

PART-A : MATHEMATICS

Note:- All answers to questions in Section-A, Section-B and Section-C must be supported by

mathematical arguments. In each of these sections order of the questions must be maintained.

SECTION-A

This section has Four Questions. Each question is provided with 4 alternative answers. One or more than one

of them are correct answers. Indicate the correct answer by A, B, C, D. (4x3=12 MARKS)

1. $x2 – 507x + 2012 < 0$ if x Î

A) (4, 503) B) R - (4, 503) C) (1, 2012) D) (10, 201)

2. A circle of radius 14 units is inscribed in a square. And a square is inscribed in the circle such that its

sides are parallel to the first square then the area bounded between the two squares is equal to

A) 49 B) 98 C) 196 D) 392

3. If P and Q are two subsets of a set S then (P-Q) U (Q-P) is equal to

A) (P'ÇQ)U(PÇQ') B) (PUQ) – (PÇQ) C) (PUQ) Ç(PÇQ)' D) (P'UQ') Ç (PUQ)

4. Let P(x) = Σ

=

7

r 0

r

r a x , where a7 = 1 and P(k) = k for k = 1, 2, 3, .., 7 then P(8) =

A) 5040 B) 5048 C) 5050 D) none of these

SECTION-B

This section has Four Questions. In each question a blank is left. Fill in the blank. (4x3=12 MARKS)

5. Area of the region bounded by |x| + |y| = 2012 is _____

6. If f(n) = n(n+1) for all natural numbers n, then the set of values of n such that f(n+4) = 4f(n) + 4 is ____

7. Consider a right angled triangle ABC with right angle at A. The radius of its incircle is r. Radius of

the circle drawn touching the line segments AB, AC and the incircle of triangle ABC is _____

8. A and B are two different numbers selected from the first forty natural numbers. The largest value that

A B

A B

-

. can have is _____

SECTION-C

State True or False in each of the following statements. (4x3=12 MARKS)

9.

22011 2 + 1 divides

22012 2 - 1

10. If x and y are perfect squares and y = x+1 then number of such ordered pairs (x, y) is more than 1

11. log213 is irrational.

12. The number of four digit numbers which are perfect squares and in which the first two digits are equal

to each other and the last two digits are equal to each other is 2

SECTION-D (4x6=24 MARKS)

13. If one root of the polynomial equation Ax3 + Bx2 + Cx + D = 0, A^1 0, is the arithmetic mean of the other two, find a simplest relation between A, B, C and D.

14. Let f: A ⍰ B be a function defined as f(x) = (x2 – 4x + 4)1/2 where A and B are subsets of R. Then find

the largest possible subset A of R+ such that f is bijective and find the corresponding B.

15. In a triangle ABC, if AD is the median through A intersecting the side BC in D then show that

AB2 + AC2 = 2(AD2 + BD2).

16. Find all possible positive integers 'n' such that n4 – 4n3 + 22n2 – 36n + 18 is a perfect square.

PART-B : PHYSICS

(10x6=60 Marks)

Questions 17 to 19 are based on the following situation.

Narrow square paths ABCD and abcd have sides of 200 m and 100 m. Two persons P and Q are initially located at a and A respectively. They both start walking in a clockwise sense with speeds of 2 m/s simultaneously.

17. When are they farthest from each other?

18. Starting from the same initial positions P and Q walk at 1 m/s and 2 m/s respectively, find the shortest distance between them.

19. With same initial positions as earlier and the speeds of 1 m/s and 2 m/s, if Q were to move anticlockwise along the path, find the largest distance between them.

20. A thin long rod A revolves at 300 rpm about a vertical axis. Another rod B is held vertically with it's lower end just above the horizontal plane swept by rod A during it's rotation. Find the maximum length of rod B, if it should fall without being hit by the rotating rod after B is released from rest. (Assume g= 10 m/s2)

21. Using 3 identical wires each having resistance 30 Ω , letter 'B' is formed . Ends of the straight wire are connected to a cell of potential difference 220 V. (i) Find the effective resistance of the circuit (ii) find the rate at which energy is delivered by the cell?

22. A cube of side 10 cm is made of a material of density d/2. It is floating in a large vessel containing two immiscible liquids whose densities are d and 3d/2 (i) Find the depth of immersion of the cube in the denser liquid (ii) Two opposite faces of the cube are pulled apart such that they are 12 cm

apart and the resulting cuboid floats vertically in the same vessel, find its depth of immersion in the denser liquid?

23. A ray of light is incident as shown on the face AB an isosceles right angled prism ABC. Find the angle of deviation of the ray emerging through face BC. Ray partially reflected at the face BC emerges through AC. Find the deviation of this ray too. Refractive index of the material of the prism is √2.

24. If 2 g of ice at 0°C is added to 2 g of water at 60°C, Find the temperature of resultant mixture? What are the resulting contents?

25. In a nuclear fission reaction 0.01% of the mass of the nucleus undergoing fission is converted in to

energy. Find the energy (E) released in the fission of 20 g of fission material, if the energy released per reaction is 200 MeV. A square meter of the earth's surface receives 1400 J every second from the sun. Find the area which receives the same energy E from the sun in one second. (Assume normal incidence)

26. Two rods A and B of lengths 100 m each are joined end to end. Velocity of sound in A is 800 m/s Young's modulus (Y) and density (d) of B are two and eight times of their respective values of A. Find the time taken by sound to travel between the free ends of the rods. (Velocity of sound in the rod is $v = Y d$)

PART-C : CHEMISTRY

SECTION-A: Each question is provided with 4 alternative answers. One or more than one of them are correct

answers. Indicate the correct answer by A, B, C, D. (5x3=15 MARKS)

27. Identify the mixed anhydride A) NO B) N_2O_3 C) NO_2 D) N_2O_4

28. Aluminium sulphate is treated with excess of caustic soda and ammonium hydroxide separately

A) first white precipitate and then clear solution is resulted by both substances

B) first white precipitate and then clear solution is remitted by caustic soda only

C) first white precipitate and then clear solution is resulted by ammonium hydroxide only

D) first white precipitate and then remains as white precipitate

29. Which statement describes a chemical property?

A) CO_2 gas is passed through aqueous solution to prepare aerated drink

B) ethyl alcohol is added to aqueous solution to prepare liquor

C) magnesium ribbon burns in air to give dazzling UV light

D) acid rain occurs during lightening in atmosphere

30. Equal volumes of 0.5M HCl, 0.25M NaOH and 2.75M NaCl are mixed. The molarity of the Cl^- ion and NaCl respectively

A) 1.0M & 1.0M B) 1.0M & 2.0M C) 1.0M & 0.5M D) 2.0M & 1.0M

31. In halogens, which of the following increases from iodine to fluorine?

A) bond length B) electronegativity C) ionization energy D) oxidising power

SECTION-B: In each question a blank is left. Fill in the blank. (5x3=15 MARKS)

32. Silver coating is formed on the walls of the test tube when silver nitrate is added to the organic compound in the presence of ammonia solution. The functional group present is _____.

33. Atoms of elements in a group in the periodic table have similar chemical properties. This similarity is most closely related to _____ electron.

34. A gaseous component X is mixed with gaseous component Y form ideal gaseous solution. Similarly a liquid component A is mixed with another liquid component B form ideal liquid solution. The similarity in both systems _____.

35. The main function cryolite in the extraction of aluminum metal from alumina is _____

36. Though nitrogen acts as an inert gas, it is not used as an inert atmosphere in the extraction of magnesium metal. Coal gas is used as inert atmosphere in the extraction. This is because _____

SECTION-C: Name the compound. (5x3=15 MARKS)

37. The salt which on thermal decomposition leaves a coloured residue, liberated a reddish brown gas and a colourless gas. The residue reacts with caustic soda to give sodium plumbite.

38. The element X(Z=85) combines with element Y(Z=38). The formula of the binary compound.

39. The product formed at the cathode during electrolysis of aqueous potassium chloride solution.

40. Quick-lime is fused with coke. An unsaturated hydrocarbon is resulted on adding cold water to the

resulting compound.

41. The reduced product is obtained when ammonia is passed over the heated copper oxide.

SECTION-D (5x3=15 MARKS)

42. Calculate the equilibrium constant, K for the reaction H2O H++OH- at 250C temperature. Given that density of water is 1 gm/cc at 250C.

43. The colourless vapours of a colourless liquid are pungent and bring tears in eyes on exposure. The

yellowish green flame is resulted on burning vapours in O2. In the presence of platinum catalyst the same reacts to give colourless gas which turns to reddish brown on explosive to air

(a) write balanced equations (b) calculate the volume of oxygen used separately for these reaction when 300 cc of vapour burn in O2 at STP.

44. pOH of a base in the range of

Give Balanced Equations for Q.No.45-46

45. An oxidizing agent which reacts with concentrated hydrochloric acid on heating, liberating chlorine gas

and forming two metallic chlorides one of which is chromium chloride.

46. A colourless compound decomposes on treatment with dilute HCl with evolution of SO2 and precipitation of sulphur.

SAT Exam Sample Paper-2010

Time: Two Hours MATHEMATICS Max.Marks: 50

(8.30 AM – 10.30 AM)

NOTE:-

1. Attempt all questions. Rough work must be enclosed with answer book.

2. While answering, refer to a question by its serial number as well as section heading. (eg.Q2/Sec.A)

3. There is no negative marking.

4. Answer each of Sections A, B, C at one place. Elegant solutions will be rewarded.

5. Use of calculators, slide rule, graph paper and logarithmic, trigonometric and statistical tables is not permitted.

Note:- All answers to questions in Section-A, Section-B and Section-C must be supported by mathematical arguments. In each of

these sections order of the questions must be maintained.

SECTION-A

This section has Five Questions. Each question is provided with five alternative answers. One or more than one of them are

correct answers. Indicate the correct answers by A, B, C, D, E. (5x2=10 MARKS)

1. Let l1, l2 be any two parallel lines and B, C be any two points on l1 and A1, A2, …., A2010 be points on l2. If D i denotes the area of

the triangle AiBC and if å

=

D

2010

i 1

i = 2010, Then the area of D A2010BC is

A) 1 B) ½ C) 2 D) 2010 E) 1005

2. Let {an} be a sequence of integers such that a1 = 1, am+n = am + an + mn for all positive integers m and n. Then a12 is

A) 6 B) 70 C) 78 D) 76 E) 72

3. In a triangle ABC, a, b, c denote the lengths of the sides BC, CA, AB. If D is the midpoint of the side BC and AD is

perpendicular to AC, then

A) 3b2 = a2 – c2 B) 3a2 = b2 – 3c2 C) b2 = a2 – c2 D) a2 + b2 = 5c2 E) none of these

4. If k is an integer then which of the following is true?

A) An integer of the form 4k+1 can always be put in the form 2k-1

B) An integer of the form 4k+3 can always be put in the form 2k+1

C) An integer of the form 2k-1 can always be put in the form 4k+1

D) An integer of the form 2k-1 can always be put in the form 4k+3

E) An integer of the form 2k+1 can always be put in the form 4k+3

5. The number of elements in {(a, b, c) / a=b, (a-c)2 = 0, a+b+c=0, a, b, c are real numbers} is

A) 0 B) 1 C) 6 D) 3 E) infinitely many

SECTION-B

This section has Five Questions. In each question a blank is left. Fill in the blank. (5x2=10 MARKS)

1. The no. of solutions of the equation xy(x+y)=2010, where x and y denote positive prime numbers, is_____

2. The number of elements in the set {nÎ N / n3-8n2+20n-13 is a prime number} is _____

3. The solution set of the equation x2 - 4x + 4 + (x-2) = 0 is _____

4. Given any two diameters of a circle the convex quadrilateral formed by joining the extremities of the diameters is always a

rectangle. True/False _____

5. If P = 32010 + 3-2010, Q = 32010 – 3-2010 then P2 – Q2 = _____

SECTION-C (5x2=10 MARKS)

1. Solve the equation log (2009) log (2010) 2010 2009 x = x .

2. In a quadrilateral ABCD, AB = 3, BC = 4, CD = 5, Đ ABC = Đ BCD = 1200. Find the area of the quadrilateral.

3. I was trying to solve 5

2

4 >

x -

. While writing the question I mistakenly wrote a digit other than 5 and solved the inequality

and got 2<x<4. What digit did I write possibly?

4. In a right angled triangle what is the relation between the square of the altitude on to the hypotenuse and the product of the

segments of the hypotenuse?

5. Is it possible to find two functions f and g such that the domain of f is not finite, the domain of g is finite, gof is defined? Justify

your answer.

SECTION-D (5x4=20 MARKS)

1. If the last digits (unit places) of the products 1.2., 2.3, 3.4,.., n(n+1) are added, the result is 2010. How many products are used?

2. Show that four divides any perfect square or leaves a remainder 1. Also show that nine divides cube of any integer or leaves 1 or

8 as remainder.

3. Let AB be a line segment of length 26. Let C and D be located on the line segment AB such that AC = 1 and AD = 8. Let E

and F be the points on one of the semi circles with diameter AB for which EC and FD are perpendicular to AB. Find the length

of the line segment EF.

4. In each of the following cases give an example of a system of two linear equations in two variables x and y.

i) A system having exactly one solution ii) A system having no solution

iii) A system having infinitely many solutions

5. Using Mathematical Induction Prove that 32n + 7 is divisible by 8, " nÎ N.

CHEMISTRY SAMPLE PAPER-2010

Time: 1 Hour CHEMISTRY Max.Marks : 50

Instructions:

(1) Answer must be written either in English or the medium of instruction of the candidate in high school.

(2) There will be no negative marking

(3) Use of calculators or graph papers is not permitted

(4) Answer all the questions. Each question carries 2½ Marks.

1. What is the action of heat on following salts? Explain with balanced equations.

a) FeSO4 ¾¾D ® b) AgNO3 ¾¾D ®

2. Sugar forms clear solution but soap forms cloudy solutions. Why?

3. What is the composition of baking powder? Explain how it bakes the bread to make it spongy? (with chemical equations)

4. When iron is exposed to atmosphere surface of the metal becomes brown but silver under similar conditions becomes black. Explain with equations?

5. BH3 acts as a Lewis acid whereas NH3 acts as Lewis base. Explain with proper structures?

6. Write the cathodic and anodic reactions when aqueous solution of KNO3 is electrolysed by using Pt electrodes.

7. What is electrolyte? What is the basic requirement for a substance to act as electrolyte?

8. In the given salt cation is called as basic radical and anion is called as acid radical. Why?

9. Why hydrogen peroxide acts as oxidising as well as reducing agent?

10. Hardness of IA-group elements gradually decreases down the group. Why?

11. What way thermochemical equations are more informative than skeletal and balanced chemical equations?

12. What are the simplest tests that are used for identification of purity of the chemical sample?

13. Total hardness of water cannot be removed by simple heating. Why?

14. CO_2 and SiO_2 are the oxides of elements of same group but CO_2 is a gas but SiO_2 is solid. Why?

15. All exothermic reactions are not spontaneous reactions. Why?

16. What are the internal factors that decide the physical state of the substance?

17. Aqueous solution of $CuSO_4$ cannot be stored in Zn container but aqueous solution of $ZnSO_4$ can be stored in Cu vessel. Why?

18. Match each of the chemical species in Column I with its property / properties given in corresponding Column II & Column III. No partial marking.

19. Ethanol (density=0.7893 g/ml) and water (density=0.9931 g/ml) at 250C are mixed in the volume ratio 1:2 to get solution of density 0.9571 g/ml. Calculate (i) the fractional change in volume and (ii) the molality of the final solution.

20. Indicate whether the following reaction is exothermic or endothermic by properly computing the given data:

$Mg + 2Xg \rightarrow M^{2+}$

$g + 2X^{-}$

g ;

IE1 of Mg = 737.7 Kj mol-1 ; IE2 of Mg = 1451 Kj mol-1 ; EA1 of Xg = -328 Kj mol-1

Column-I Column-II Column-III

a) BeH_2 1. sp^3d^2 (i) trigonal planar

b) CH_2BrCl 2. sp^3 (ii) octahedral

c) PF_6^- 3. sp^2 (iii) distorted tetrahedron

d) BF_3 4. sp (iv) linear

PHYSICS SAMPLE PAPER

Time: ONE Hour Max. Marks: 50

· Answers must be written either in English or the medium of instruction of the candidate in high school.

· Answer all the questions in the booklets provided for the purpose.

· There will be no negative marking.

· The relevant working or the argument in arriving at an answer has to be included in your answer.

· Use of calculators is not permitted.

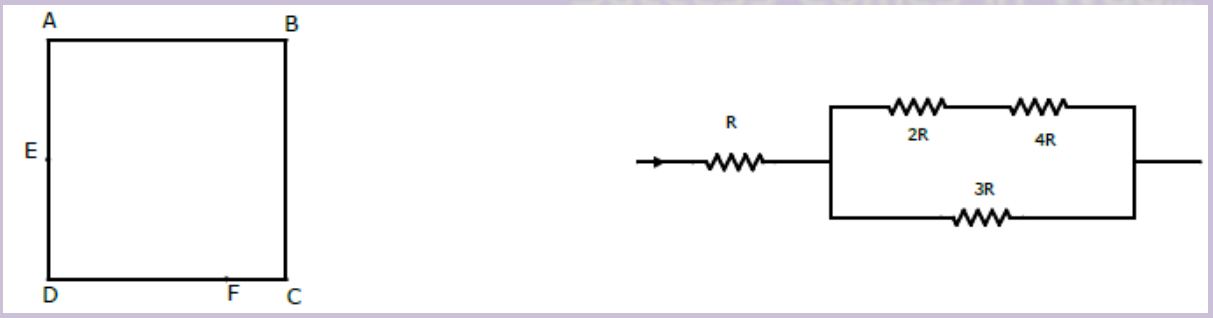
· Questions in Part A carry 5 marks each , questions in part B carry 2 marks each.

Part A

1 A body dropped from a very large height , experiences resistance to its motion due to air and has a varying acceleration which decreases to zero in time t. Assume the displacement in this time and the velocity acquired at the end of this time are same as that due uniform acceleration of cg (c is a constant less than 1). The body then travels with a uniform speed acquired at the end of time t. Find the displacement of the body in time 2t.

2 A bright point object is kept at some distance from a lens of focal length 20 cm. If the object distance is changed 5/6 times, the distance of the screen from the lens has to be changed by 5/3 times to obtain a clear image on the screen. Find the distance through which the screen has been moved.

3 ABCD is a square of side 400 m. E and F are points 200 and 300 m away from corner D. Two persons starting from E and F and moving away from D, meet at B. Where would they meet if they were to travel towards D.



4 In the circuit shown PD across R is V. Find the PD across the resistance 2R

5 Two liquids of densities 2 gcm-3 and 4 gcm-3 of equal volumes form a homogenous mixture. A solid object made of materials of density 1 gcm-3 and 5 gcm-3 mixed homogenously is just found to just float in this mixture. What is ratio by volumes/masses of the materials of the solid object?

6 A man is standing to the south of a vertical conductor carrying current facing the conductor. Direction

of the magnetic field at a position in between him and the wire is from his left to right. What would be

magnetic field direction behind him if he moved to a position (i)east of the conductor (ii) to the north

of the conductor. Assume he always faces the conductor and current direction in the wire remains

constant. (Express these directions as east or west etc..)

7 Average energy required by an adult to sustain himself is 1500 kilocalories per day . A medium sized

banana is about 100 g and provides about 100 kilocalories. How many kg of bananas are required per day

to sustain a population of 1000 million? If some how the biological processes were to be sustained by

nuclear reactions, how many kg of mass must disappear to provide this energy?

8 A ray of light is incident at 45° on to a transparent slab of thickness 10 cm made of a material of

refractive index Ö2. Find the lateral displacement of the ray as it emerges from the slab.

Part B

9 Length of a wire of resistance R and resistivity r is doubled by stretching it. What will be its new

resistance and resistivity?

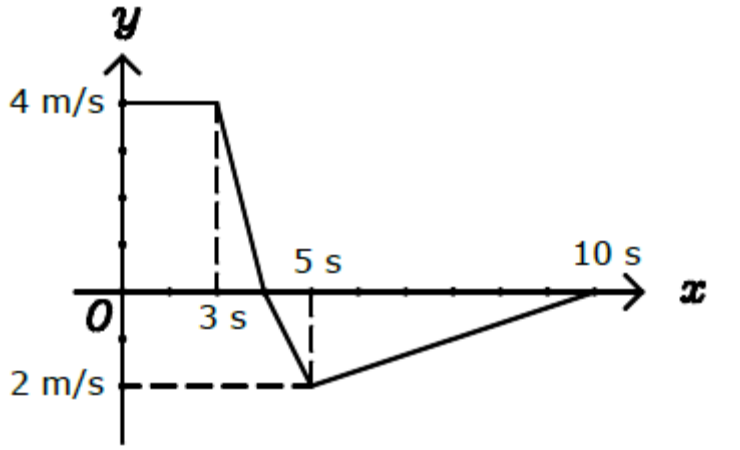
10 A solid object made of material of density 0.79 gcm-3 of negligible coefficient of cubical expansion is

floating in a liquid of density 0.8 gcm-3 at 20 °C. When the temperature is raised to 220 °C, the solid

object starts sinking in the liquid. Find the coefficient of cubical expansion of the liquid.

11 Velocity time graph of a body is as

shown. Find it's displacement in 10 s.



12 Sound wave of wavelength 0.5m in air passes in to water. What is its wavelength in water? Also find the

frequencies of the wave in air and water (Velocity of sound in air and water are 350 m/s and 1400 m/s

respectively)

13 A 1000 MW thermal power plant burns 106 kg of coal in one hour. How many kg of coal is burnt to

produce the power required to light up a 100 W lamp for 8 hours.