केन्द्रीय विद्यालय संगठन

Autumn Break Assignment 2020-2021

OCTOBER 22,

KENDRIYA VIDYALAYA NO 1

ARMAPUR,KANPUR

Class 6

SCIENCE

Question /answers of chapter 8 & diagrams to practice of different bones and joints.

Class 7

SCIENCE

Question /answers of chapter 8 &9

SCIENCE

Also to collect information of the latest cyclonic disaster faced by the country& Prepare a Soil map of India.

COMMON ASSIGNMENT FOR ALL STUDENTS OF CLASS 6 &7

To prepare “TOYS FOR UPCOMING SCIENCE EXHIBITION”

Based on scientific principle/mathematical modeling/learn history or language concepts/health hazards with preventive measures

Autumn break homework

Subject-science

Class-8

Q.1 Read the chapter 9 thoroughly and write down the important keywords In the class work notebook.

Q. 2 Complete the question and answers of 3 CCT based test items in your CCT notebook. No need to copy the passage.

B. Prepare one exhibit (model/toy). Keep subject and theme in mind while preparing the exhibit for science exhibition to be held in our vidyalaya on 7th November 2020.

C. Do follow up work of half yearly exam question paper in your class work notebook and learn them.

First CCT based test item

IVF

In today's world, I.V.F i.e in-vitro fertilization is a

gift from science. It is one of the more widely

known types of assisted reproductive

technology. It is a combination of medicines and

surgical procedures to help sperm fertilize an

egg and help the fertilized egg implant in the

uterus.

Q.1. IVF i.e. in-vitro fertilization can be considered as -

a) internal fertilization b) external fertilization c) both d) none of these

Q.2. Does the term 'Test Tube baby' represent that baby grows in test tubes?-give reason

for your response.

Q.3.Zygote cannot form only for those women whose oviduct is blocked. Yes/No

Q.4. If a Zygote is placed in any other woman's uterus, then will the woman be the biological

mother of the baby?

Second CCT based test item

INCREASING OBESITY IN INDIA AND NUTRITION

A set of cohort studies from India have been attempting to follow up new born babies till they are young adults and study the implications of low or high weights at birth and in early childhood for later life. Both are associated with increased insulin resistance as well as obesity during adulthood (Bhargava et al 2004; Sachdev et al 2005). The underlying processes of adiposity (higher body fat in thin infants), higher probability of infections, insulin resistance and micronutrient imbalance through epigenetic programming in early maternal and foetal under nutrition leading to obesity, diabetes and heart diseases have also been reported (Yajnik 2004). The cohort studies from Pune reflect on the role of maternal under and over nutrition arguing that Both, maternal-foetal under nutrition and over nutrition are associated with increased adiposity and insulin resistance in the children … Improving nutritional status of the young generation (especially that of young women in reproductive age) offers a potential for intergenerational prevention of NCDs. (Yajnik 2016) The "double burden of malnutrition," which is largely perceived as a combination of two separate problems—under nutrition and obesity—is not really so in the Indian context. The latter, which is perceived as a new epidemic of transitional societies with its associated NCDs over and above widespread under nutrition, is actually rooted in the former to a large extent. To break this link between the two, India needs a comprehensive strategy for health and food security. The longstanding strategy of cheap carbohydrate-based food to meet calorie adequacy (which was no doubt crucial) must evolve to ensuring energy and nutrient adequacy (calorie, protein and micronutrients). Ensuring food sufficiency of that sort has to

go hand in hand with measures to increase awareness regarding overweight/obesity, its associated risk with NCDs, and the role of diets. There is an urgent need for a comprehensive nutrition policy. The existing food programmes need strengthening and overhaul. It is time that the public distribution system includes pulses, vegetables and coarse-cereals and not just wheat and rice. Anganwadi and school meals should include variety like eggs and milk, and the district healthcare infrastructure with its community health, primary health and sub-health centers must be equipped with necessary resources to tackle all malnutrition-related morbidities.

(Interpretations and Implications of Increasing Obesity in India by Sourindra Mohan Ghosh, Research scholar &ImranaQadeer,Distinguished Professor, Council for Social Development, Delhi Economic and Political Weekly,Journal » Vol. 55, Issue No. 1, 04 Jan 2020 (/journal/2020/1)

QUESTION 1.

There is a need of comprehensive nutritional policy for India , because

i)) More undernourished children are there. ii) More obesity is found among children

iii) Children are not getting food in rural India. iv) Children of urban India are getting more food than rural India.

a) i

b) i & ii

c) iii

d) iv

QUESTION 2.

How can be Malnutrition related with the obesity?

QUESTION 3.

Why can more tinned food, chips leads to higher probability of diabetes?

QUESTION 4.

The Metric BMI formula is Weight(Kg)/ (Height in meter)2

Ram is studying in class VIII . His weight is 45 Kg and height is 4.5ft. Akbar is also studying in class VIII . His weight is 75 Kg and height is 5 ft. Both of them are living in hostel and getting equal facilities. Calculate the BMI of both the students. Who is obese and why though they are now living under condition?

Third CCT based test item

Smoking is bad for your health!

Smoking cigarettes "has been identified as the most important source of preventable morbidity and premature mortality worldwide" (Smoking 101 Fact Sheet). Smoking is probably worse for you than you think. For example, 438,000 Americans die from smoking-related diseases annually.

Here are some facts about smoking from the American Lung Association:

● Cigarette smoke contains over 4,800 chemicals, 69 of which are known to cause cancer. Smoking is directly responsible for approximately 90 percent of lung cancer deaths and approximately 80-90 percent of COPD (emphysema and chronic bronchitis)

● Males tend to have significantly higher rates of smoking prevalence than females. In

2005, 23.9 percent of males currently smoked compared to 18.1 percent of females

● Each day, nearly 6,000 children under 18 years of age start smoking; of these, nearly 2,000 will become regular smokers. That is almost 800,000 annually

● Approximately 90 percent of smokers begin smoking before the age of 21

● If current tobacco use patterns persist, an estimated 6.4 million children will die prematurely from a smoking-related disease

● Tobacco use in adolescence is associated with a range of heath-compromising behaviours, including being involved in fights, carrying weapons, engaging in high-risk sexual behaviour and using alcohol and other drugs

In addition, secondhand smoke is very bad for you. Secondhand smoke "is a mixture of the smoke given off by the burning end of a cigarette, pipe, or cigar and the smoke exhaled from the lungs of smokers" (Secondhand Smoke Fact Sheet).

Here are some facts about second-hand smoke from the American Lung Association (to shock those who do not believe that their smoking does not affect others):

● Secondhand smoke has been classified by the Environmental Protection Agency (EPA) as a known cause of cancer in humans (Group A carcinogen)

● Secondhand smoke exposure causes disease and premature death in children and adults who do not smoke. Secondhand smoke contains hundreds of chemicals known to be toxic or carcinogenic, including formaldehyde, benzene, vinyl chloride, arsenic ammonia, and hydrogen cyanide

o Formaldehyde: irritating gas usually in liquid form used as a disinfectant and preservative

o Benzene – flammable, toxic liquid, used for motor fuel
Vinyl chloride – flammable carcinogen, used to make vinyl resins

o Hydrogen cyanide – poisonous (usually gaseous) compound that smells like

bitter almonds

● Secondhand smoke causes approximately 3,400 lung cancer deaths and 46,000 heart

disease deaths in adult non-smokers in the United States each year

● The current Surgeon General's Report concluded that scientific evidence indicates

that there is no risk-free level of exposure to secondhand smoke. Short exposures to

second hand smoke can cause blood platelets to become stickier, damage the lining

of blood vessels, decrease coronary flow velocity reserves, and reduce heart rate

variability, potential increasing the risk of heart attack just like that of the smokers.

These facts are indisputable, and because of this, many cities around the United States have

banned smoking in public places. Many college campuses have also banned smoking

including Miami University of Ohio. President Hodge passed a smoking ban in 2008.

QUESTION 1.

Is it harmful if someone around you is smoking? Justify.
QUESTION 2.

The deadly effect of smoking is well established but why do companies make cigarettes?

Highlight any two plausible reason behind it.
QUESTION 3

Think rationally to explain why people keep smoking after they start.

QUESTION 4

Investigate scientifically how smoking increases the chance of heart attack. List two possible reasons behind it.

QUESTION 5

Read each statement carefully and categorise them as fact of myth

A) E-cigarettes are not harmful as cigarettes.

B) Smoking helps to get rid of stress.

C) Cigarette smoke is carcinogenic in nature.

D) Many smokers live into very long age, so it can't be that harmful.

B. Prepare one exhibit (model/toy). Keep subject and theme in mind while preparing the exhibit for science exhibition to be held in our vidyalaya on 7th November 2020.

VIRTUAL SCIENCE EXHIBITION will be conducted by our vidyalaya on 07/11/2020.

Please see the subject carefully

SUBJECT: PROMOTION OF TOYS AS A TOOL FOR EDUCATION

Also go through the theme,

THEME:- Promoting Scientific Temper

You can also take any of your ideas to make model/ toys but keep the theme in mind.

Because this exhibition is online therefore please prepare.

1. a model/toy or a working model
2. Video explaning the presentation (topic)
3. PowerPoint presentation (for explanation)
4. Write up in pdf (all information of how you prepared the model/toy and how does it work.

CCT PRACTICE QUESTIONS CLASS -7

Can with hot water being cooled

Q1.1 Which of the following is proved by the experimental demonstration

a) Air exerts pressure: Yes/No

b) Water vapour exerts pressure: Yes/No

Justify your answer:

a)

b)

Q1.2 **Statement:** Smoke moves in upward direction

Reason: Smoke is ----------air

Hot air is----------

Q 1.3 Convection in air occurs

When the hot air in a region rises up----------

---------.

Depict the above phenomena identified in 1.3 with a diagram

Class - VI MULTIPLE CHOICE QUESTIONS - (BODY MOVEMENTS)

Choose the correct option:

1. **The joint which allows movement in all the directions is called:**

   (a) Pivotal joint (b) Hinge joint

   (c) Ball and socket joint (d) Gliding joint

2. **Which of the skull bones are movable?**

   (a) Upper jaw (b) Teeth (c) Eye socket (d) Lower jaw

3. **---------- is the strongest and longest bone in the body.**

   (a) Thigh bone (b) Chest bone (c) Shoulder bone (d) The backbone

4. **The tissue which helps in the movement is called:**

   (a) Epithelial tissue (b) Muscular tissue

   (c) Connective tissue (c) Nervous tissue

5. **The ---------- pairs of ribs make a cone shaped cage.**

   (a) 11 (b) 10 (c) 12 (d) None of these

6. **Stomach is an:**

   (a) External organ (b) Internal organ (c) Both (d) None of these

K V NO.1 ARMAPUR KANPUR

SUB-SST Class- IX

Homework for autumn break- 2020(21\10\2020-30\10\2020)

Q1) what was the condition of Russia during the First World War?

Q1) प्रथम विश्व युद्ध के दौरान रूस की क्या स्थिति थी?

Q2) Describe the main events of the October revolution in Russia.

Q2) रूस में अक्टूबर क्रांति की मुख्य घटनाओं का वर्णन करें।

Q3) why does the rainfall decrease from the east to west in northern India?

Q3) उत्तर भारत में वर्षा पूर्व से पश्चिम की ओर क्यों घटती है?

Q4) what is coriolis force describe briefly its effect on the world climate?

Q4) कोरिओलिस बल विश्व जलवायु पर इसके प्रभाव का संक्षिप्त वर्णन क्या है?

Q5) what is significant of the preamble to the Indian constitution?

Q5) भारतीय संविधान की प्रस्तावना में क्या महत्वपूर्ण है?

Q6) Explain five major factors which contributed to the making of our constitution.

Q6) पाँच प्रमुख कारकों की व्याख्या कीजिए, जिन्होंने हमारे संविधान को बनाने में योगदान दिया।

Q7) Describe current government strategy of poverty of Alleviation.

Q7) गरीबी उन्मूलन की वर्तमान सरकार की रणनीति का वर्णन करें।

Q8) Identify the social and economic groups which are most vulnerable to poverty in India.

Q8) उन सामाजिक और आर्थिक समूहों की पहचान करें, जो भारत में गरीबी की चपेट में हैं।

PROJECT WORK

Q1) prepare a file on account of COVID-19 and write about the affect on the Indian economy /industries. (Page 10-15) including pictures /photos/newspaper cutting etc.

Q1) COVID-19 के आधार पर एक फ़ाइल तैयार करें और भारतीय अर्थव्यवस्था / उद्योगों पर प्रभाव के बारे में लिखें। (पृष्ठ 10-15) सहित चित्र / फोटो / समाचार पत्र काटना आदि।

K.V.NO.1 ARMAPUR KANPUR

AUTUMN BREAK HOME WORK,

SUBJECT- MATHEMATICS,

CLASS-VI

Instructions: Do the following questions in one separate notebook.

1. Write the smallest and the largest six digit numbers. How many numbers are between these two.

2. In a school there are two sections – section A and section B of Class VI. There are 32 students in section A and 36 in section B. Determine the minimum number of books required for their class library so that they can be distributed equally among students of section A or section B.

3. The population of a town was 59000. In one year it was increased by 4536 due to new births. However, 9218 persons died or left the town during the year. What was the population at the end of the year?

4. The sum of two integers is − 23. If one of them is 18, then the other is

5. (i) Write 4 negative integers less than – 10.

(ii) Write 6 negative integers just greater than – 12.

6. Reduce each of the following fractions to its lowest term (simplest form):

1. (i) 40/75

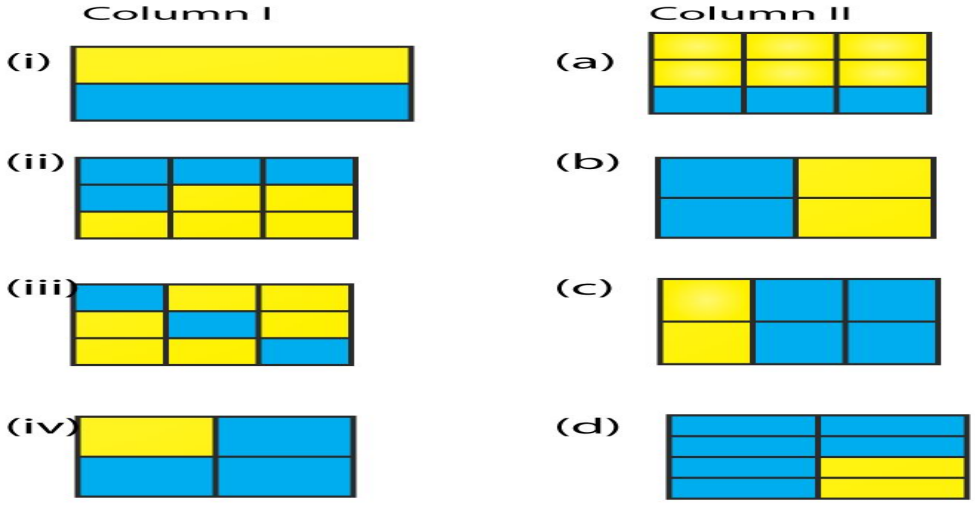
(ii) 42/28

(iii) 12/52

(iv) 40/72

(v) 80/24

7. Write the fractions and match fractions in Column I with the equivalent fractions in Column II



8. The circumference of three wheels are 40,50 and 70c.m. If they moving simultaneously,then what is the least distance they should cover before one revolution?

9. In the given figure, name the following angles as acute, obtuse, right, straight or reflex.

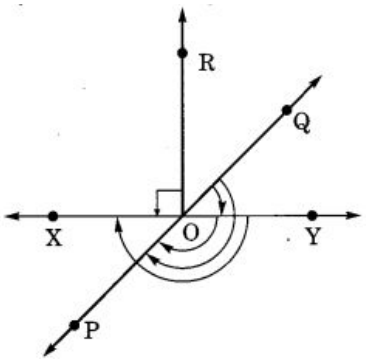
(a) ∠QOY

(b) ∠YOP

(c) ∠ROX

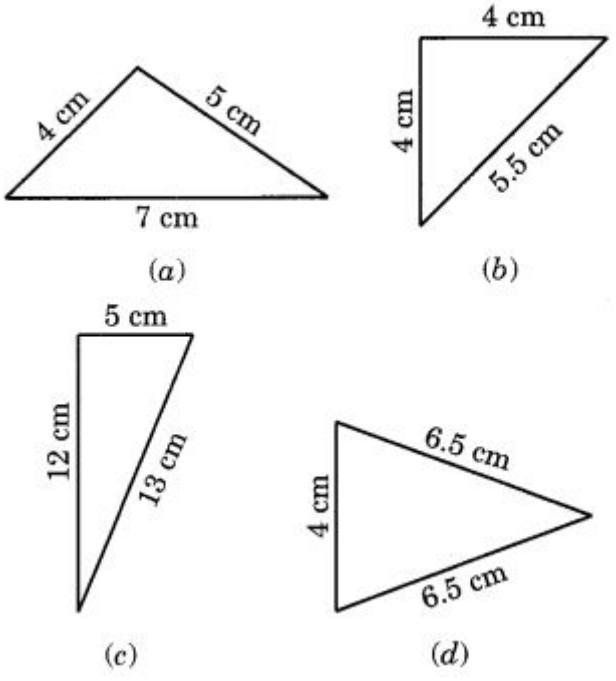
(d) ∠QOX

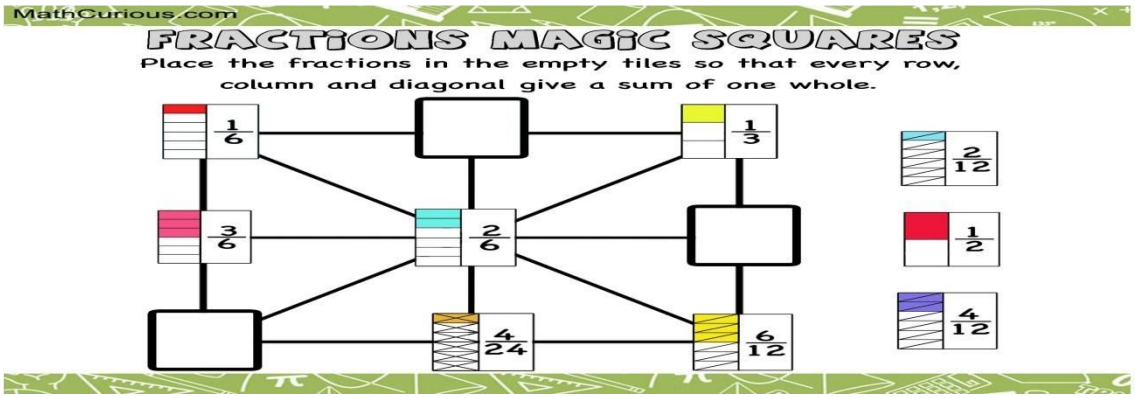
(e) ∠POQ



10.Classify the given triangles whose sides are indicated

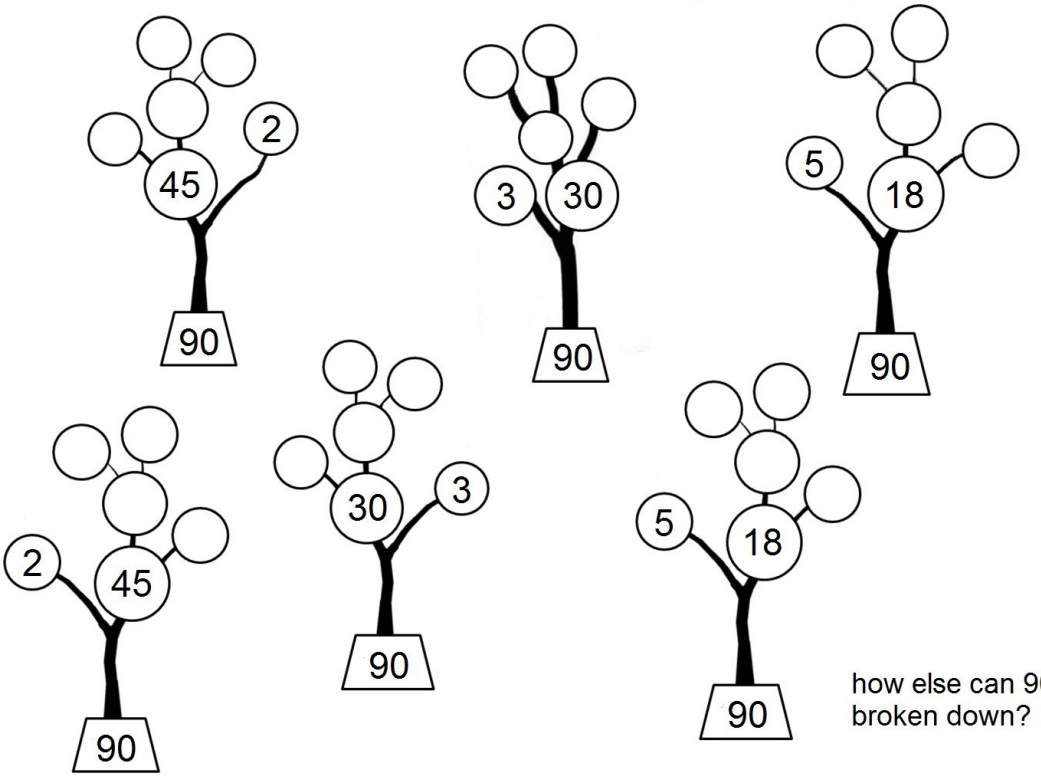
11-





12-

complete these, to show how 90 can be broken down in this particular way

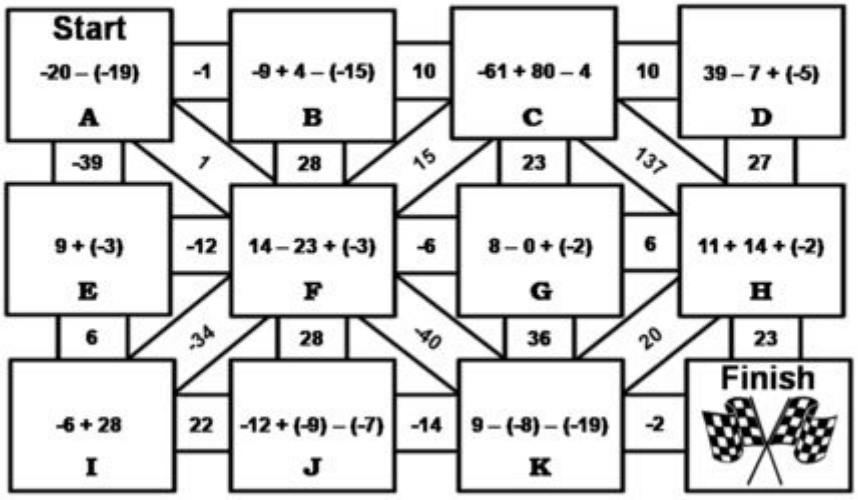


how else can 90 be broken down?

13-

Adding and Subtracting Integers Maze Name _____

Use your answers to guide you to the end of the maze.



14- Prepare a toy /model for exhibition in school.

Theme- Promoting scientific temper and mathematical thinking.

Subject- Promotion of toys as a tool for education.

15-Complete and revise all work till chapter fractions.

HAPPY HOLIDAYS

KENDRIYA VIDYALAYA ARMAPUR NO.1 KANPUR

SESSION – 2020-21

AUTUMN BREAK HOME WORK

CLASS- VI SUBJECT – SOCIAL SCIENCE

HISTORY-(21/10/2020 TO 23/10/2020)

1-READ ALL THE CHAPTERS FROM 1 TO 6 AND LEARN THE QUESTIONS AND ANSWERS.

2- MAKE A PROJECT/PPT ON THE INDUS VALLY CIVILIZATION.

3-MAP WORK- (IN FILE)

(I)-SHOW THE MAIN RIVERS OF INDIA.

(II)- WRITE NAME OF STATES AND ITS CAPITALS.

(III)-SHOW THE MAIN PLACES OF INDUS VALLEY CIVILIZATION.

GEOGRAPHY-(24/10/20 TO 27/10/2020)

1- READ ALL THE CHAPTERS FROM 1 TO 4 AND LEARN THE QUESTIONS AND ANSWERS.

2-MAKE A CHART IN FILE OF THE SOLAR SYSTEM.

3-MAKE IMPORTANT LATITUDES AND HEAT ZONES AND SHOW SOME LONGITUDES ON THE EARTH .

4-DRAW THE FIGURE OF REVOLUTION OF THE EARTH AND SEASONS.

5- MAP WORK- TAKE A POLITICAL MAP OF INDIA AND SHOW ALL ITS STATES WITH UNION TERRITORIES .

CIVICS –(28/10/2020 T0 30/10/2020)

1- READ ALL THE CHAPTERS FROM 1 TO 4 AND LEARN THE QUESTIONS AND ANSWERS.

2-WRITE ABOUT THE LIFE AND WORKS OF DR. BHIM RAO AMBEDKAR.

3-MAP WORK- SHOW THE INTERNATIONAL AND STATE BOUNDRIES OF INDIA.

K.V.NO.1 ARMAPUR KANPUR

AUTUMN BREAK HOME WORK,

SUBJECT- MATHEMATICS,

CLASS-VII

Instructions: Do the following questions in one separate notebook.

CCT

1- During a twelve week school term, Tej and his sister Smriti agreed to wash the dishes for their parents from Monday to Friday. Tej did them on Monday, Wednesday and Friday, leaving Smriti to do them on Tuesday and Thursday. They negotiated with their parents to be paid Rs. 2 for the first week, Rs.4 for the second week, Rs.8 for the third week, and so on. If anyone forgets to do his/her job on any weekday, he/she has to return Rs.3.

Consider the following questions:

Question1. How *much* will they be paid in weeks 4, 5 and 6?

Question2. What amount of money would *Tej* be paid for the *final* week of term?

Question3. If Smith forgets to wash dishes on 3 days in the first four weeks of their school term, how much money would she be getting during the entire four weeks?

2. Mode of Transport

A survey was conducted for the students studying in class VII of Zedland New school for the different modes of transport available for them to travel. Sanju and Manju started from their house to go to school .They had four different options of Mode of transport available for them to travel

Mode of Transport	Distance Covered (in Km)	Time Taken (in hours)
Walking	40	10
Cycle	100	20
Car	600	10
Bus	500	25

Read the table and answer the questions:

1. The Speed of the bus in Km/h is
(A) 4 (B) 5 (C) 60 (D) 20

1. What is the ratio of speed of the car and the cycle?
(A) 1:12 (B) 12:1 (C) 5:2 (D) 2:5

1. In the above given information, which mode of the transport has the fastest speed?

(A) Bus (B) Car (C) Walking (D) Cycle

3. DECODING

Sunil and Amit are students of class 7th. They are solving problems on simple equations. For developing the interest among students, teacher had a new idea. He asked the students to solve the following equations and promised them to give the thing they make out by arranging all the variables of the given family of equations:

2m+5=13, 5g – 3=12, 4n=20, 12a+3=27,

a) What are the solutions of equationsasked by the teacher?
b) Name the thing that the teacher awarded to the students.

c) Taking the game to next level, Amit askedSunil for his contact number. Sunil told Amit that his number is'9xyz01q2r1'. To decode his number, Sunil further asked Amit to solve the following set of equations.

(i) 3x=15 (ii) 2(y+1)=(y+3) (iii) 6z+4=52 (iv) q-2q =12 (v) 2r- 3=9

Find thecontact number of SUNIL?

4. Four friend John, Richard, Harry and Rozy starts driving their car from same starting point in the direction of East, West, North and South respectively at the speed of 30km/hr, 40km/hr,50 km/hr and 60 km/hr respectively. After 1hours find

1 Distance between John and Richard.

2 Distance between John and Harry.

3 Distance between John and Rozy.

4 Distance between Richard and Harry.

5 Distance between Richard and Rozy.

.....

5. **In a "magic square", the sum of the numbers in each row, in each column and along the diagonal is the same. Is this a magic square?**

(4/11)	**(9/11)**	**(2/11)**
(3/11)	**(5/11)**	**(7/11)**
(8/11)	**(1/11)**	**(6/11)**

6. In the given figure, two of the angles are indicated. What are the measures of ∠ACX and ∠ACB?

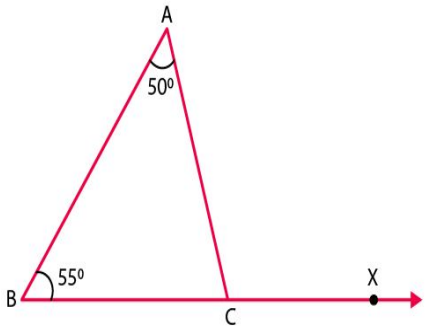
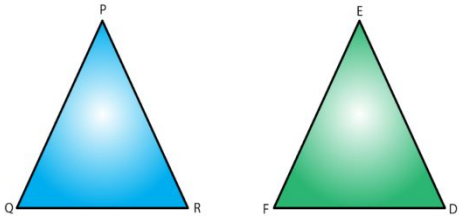


Fig. 36

7. In ΔPQR ≅ ΔEFD,

(i) Which side of ΔPQR equals ED?

(ii) Which angle of ΔPQR equals angle E?

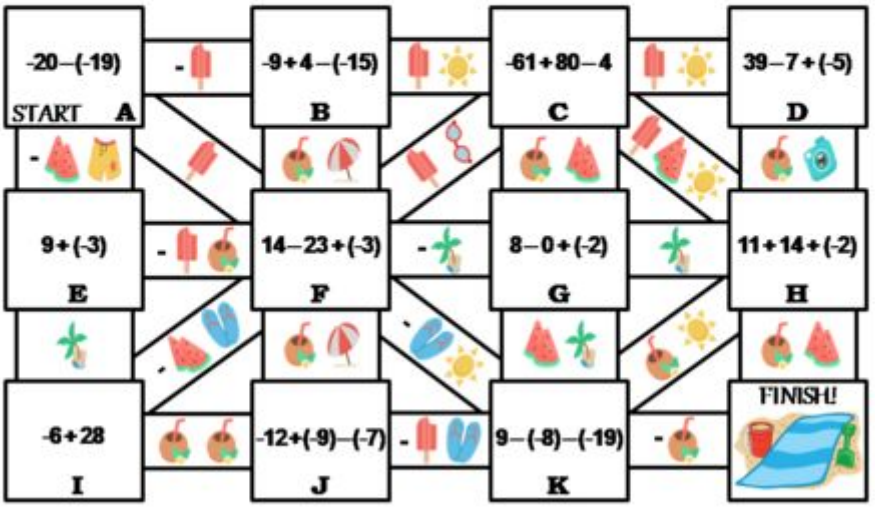


8.

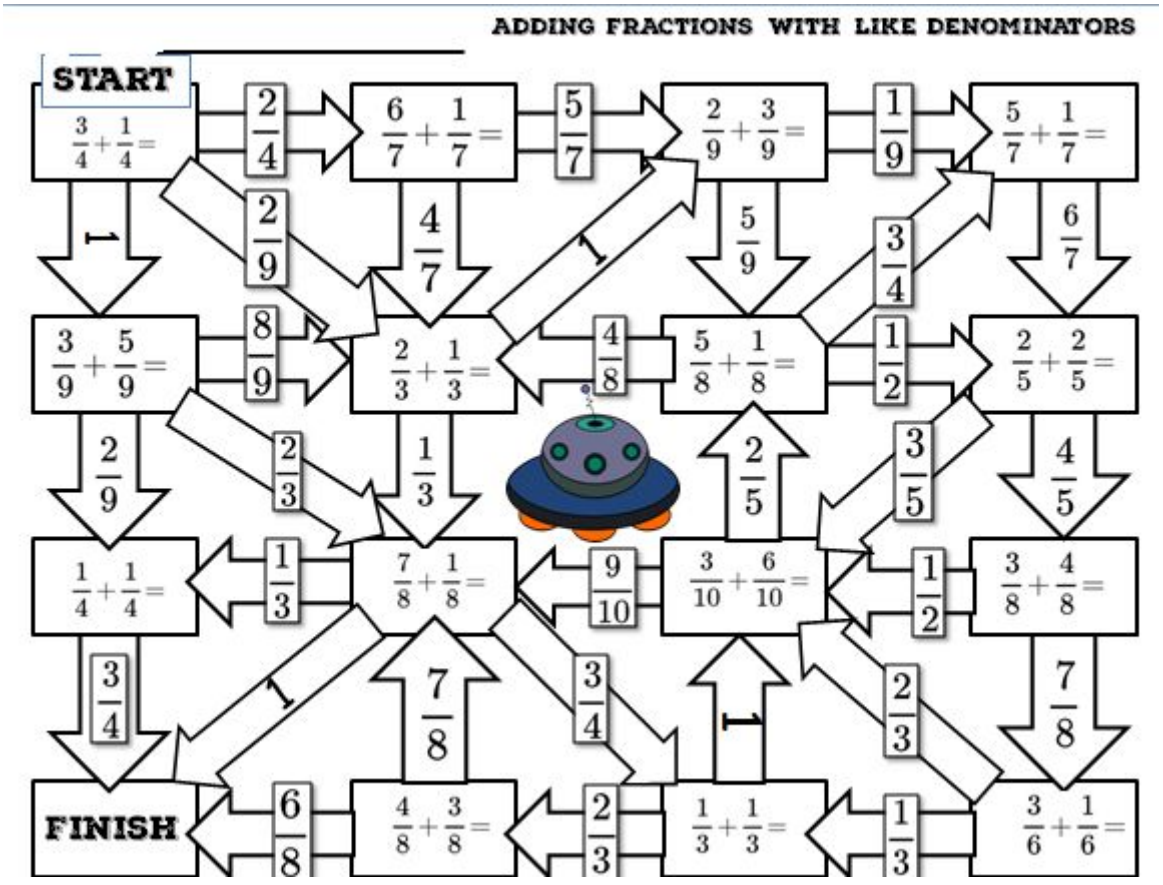
Adding and Subtracting Integers
End of Year Maze

Use your answers to guide you to the end of the maze.

= 0 = 1 = 2 = 3 = 4
= 5 = 6 = 7 = 8 = 9



9.



10- Prepare a toy /model for exhibition in school.

Theme- Promoting scientific temper and mathematical thinking.

Subject-promotion of toys as a tool for education .

HAPPY HOLIDAYS

KV NO.1 ARMAPUR, KANPUR
HOLIDAY HOMEWORK FOR AUTUMN BREAK
CLASS VIII- A,B,C,D (2020-2021)
SUBJECT- ENGLISH
SUBJECT TEACHER- BEENA PRAJAPATI

1. Prepare 5 bookmarks with a quote on importance of Book / English.

2. Write a paragraph on the following topics (one page each):
What you want to be when you grow up
Environmental Pollution
Covid-19 and its impact on us

3. Read any two story books and complete the given data:
a. Title (Name of the story)
b. Author's name
c. Characters in the story
d. Who is your favourite character and why?
e. Moral of the story

4. Write 5 days diary entry.

5. Prepare a collage of newspaper headlines or pictures (national,international, sports, cultural) (any 5 days).Pick the important ones.
6. Write a notice for the school notice board,regarding a four-day trip to Madhya Pradesh .Sign yourself as the Amrita/Aman Headgirl/Headboy of your school.
7. : Read the following conversation carefully:
Rosy : Hello ! is it 1234567890 ?
Rehana : Yes, please. Who's it there?
Rosy : I'm Rosy, a friend of Roma. Where is she?
Rehana : Oh! Sorry. Actually she has forgotten her mobile here. She has gone to the market. Can I help you, please ?
Rosy : Oh, sure. In fact, I wanted to convey her that today's music classes \ shall be suspended because the teacher is not well. Instead it will be held on Sunday. So she should remember it. Could you please pass this message to her?
Rehana : Oh! Sure. Thank you.
Rosy : Thank you too.
As Rehana is going to her dance classes she needs to reproduce the message for Roma. Write the message on her behalf with every detail.

Do all the work in the Class Work copy.

KENDRIYA VIDYALAYA NO.1 ARMAPUR KANPUR

HOLIDAY HOME WORK FOR AUTUMN BREAK
(21/10/2020 TO 30/10/2020)
CLASS –VIII
SUBJECT- MATHEMATICS

1. The difference between compound interest and simple interest on a sum for 2 year at 8% per annum is ₹ 768. Find the sum.
2. Find the square root of 2 and 3 by division method up to 3 decimal places.
3. Construct a rectangle with adjacent sides of length 5cm and 4 cm.
   (Write steps of construction)
4. Represent 3/8 , -5/8 and 7/8 on number line.
5. The digits of a two-digit number differ by 3. If the digits are interchanged, and the resulting number is added to original number, we get 121. Find the original number.

LOGICAL REASONING

6. In a certain code language the word CONFUSED is written as EMNBEFTV. How will the word SECLUDED be written in that language?
   (a) RDBKEFEV
   (b) KBDRCDCT
   (c) KBDREFEV
   (d) MDFTCDCT
7. Ritu and Priti starts walking from a fixed point. Ritu moves 5 km westward and turn left and then cover 6 km . Priiti moves 7 km north ward ,turns left and walks 5 km. The distance between Ritu and Priti now is
   (a) 10km
   (b) 13km
   (c) 8km
   (d) 6km

CCT TYPE QUESTIONS

8. The floor of a square room is covered with a square foot floor tiles. If 64 tiles cover the floor, how long is the side of the room? What is the relationship between the area of one square tile and area of floor?

9. There are some boys and girls in a room. The square of the number of the girls is less than the square of the number of boys by 28. If there were two more girls, the number of boys would have been the same as that of the girls. The total number of the boys and girls in the room are
   (a) 56
   (b) 14
   (c) 10
   (d) 7

10. In a Mathematics lab. There are some cubes and cuboids of following measurements
   (i) One cube of side 4 cm
   (ii) One cube of side 6 cm
   (iii) 3 cuboids each of dimensions 4cm ×4 cm ×6cm
   (iv) 3 cuboids each of dimensions 4cm ×6 cm ×6cm
   A student wants to arrange these cubes and cuboids in the form of big cube. Is it possible to arrange them in the form of big cube? If yes, then find the length of side of new cube so formed.

PROJECT

Topic- Area and perimeter of 2-D figures

(Explain about each 2-D figure with colourful diagram then to find area and perimeter)

Note – Use of drawing paper or A-4 size paper

AUTUMN BREAK HOLIDAY HOMEWORK

Class X-A, B, C, D

Name of the teacher MRS SADHANA SRIVATAVA

TGT ENGLISH

Q1. Write a letter to the editor of local newspaper about healthy eating habits. You are Ankit/Ankita, a resident of New Delhi.

Q2. You are sports teacher of K.V. No.1 Armapur, Kanpur. Write a letter to M/S Sheetal Sports Agra, placing order for cricket bats, balls, gloves and other equipment in about 100-120 words.

Q3. You have purchased a smart T.V from Smile Store Birhana Road, Kanpur. The T.V is not working properly. Write a letter of complaint stating the problems you are facing.

Q4. Select any five reading passages from sample papers and do it in your notebook.

Q5. Write an article on the following topics

i. Precautionary measures to combat COVID-19
ii. Online classes

Q6. Revise the chapters taught in class from both the books.

Q7. Write the character sketch of the following characters.

i. Lencho
ii. Nelson Mandela
iii. Wanda Petronski

KENDRIYA VIDYALAYA NO-1 ARMAPUR, KANPUR

HOLIDAY HOME WORK

AUTUMN BREAK (FROM 21-10-2020 TO 30-10-2020)

CLASS:- X

SUB:- SOCIAL SCIENCE

Answer the following questions (In S.st, note book)

1- How were the germs used as a powerful weapon by the Portuguese and the Spanish for the colonisation of America?

अमेरिका में उपनिवेशवाद के लिए पूर्तगालियों और स्पेनिशों ने कीटाणुओं को एक अस्त्र के रुप में कैसे प्रयुक्त किया था ?

2- Explain how power is shared among the different organs of government (in both vertical and horizontal)

वर्णन करें कि सरकार के विभिन्न अंगो में सत्ता की साझेदारी कैसे होती है?

3- Why the tertiary sector becoming so important in India? Give at least for reasons.

भारत में तृतीयक क्षेत्रक इतना अधिक महत्वपूर्ण क्यो हो गया हैं। कम से कम चार कारण बताएँ।

4- Evaluation of positive and negative aspect of river valley project.

नदी घाटी परियोजना के सकारात्मक और नकारात्मक पहलू का मूल्यांकन करें।

5- Globalization and its impact on agriculture and industries.

वैश्वीकरण का कृषि और उद्योगों पर प्रभाव।

(In a file)

6- Prepare a project on the steps to minimise environmental degradation.

पर्यावरण क्षरण को कम करने के लिए एक परियोजना तैयार करें।

7- Prepare a project report on the need of rules and regulations required in a market place?

बाजार में आवश्यक नियमों और विनियमों की आवश्यकता के बारे में एक परियोजना रिपोर्ट तैयार करें?

8- Prepare a file of pages 10 to 15 on Covid-19. Paste picture and write precautions SOP and guide line given by government of India. What are the effect on Indian economy/ Industries due to Covid-19.

कोविड-19 पर पेज 10 से 15 की फाइल तैयार करें। भारत सरकार द्वारा दी गई एसओपी और गाइड लाइन की सावधानियां लिखें। कोविड-19 के कारण भारतीय अर्थव्यवस्था/उद्योगों पर क्या प्रभाव पड़ा है? इससे सम्बन्धित चित्र भी चिपकाएँ।

एस डी .राम.

टी.जी.टी.(सामाजिक अध्ययन)

Autumn break homework

Session: 2020-2021

Class 11th

Subject: Biotechnology

Date: 20/10/2020

1. Prepare the project file on the topics:

a) Diagram of Plant cell and animal cell with proper labelling.

b) Give function and also draw the structure of following-

Cell membrane

Cytoskeleton

Nucleus

Mitochondria

Plastids

Golgi apparatus

Endoplasmic reticulum

Lysosomes

Ribosomes

Peroxisomes

c) Types of animal tissues(details along with proper labelled diagrams)

d) Types of plant tissues(details along with proper labelled diagrams)

2. Prepare your practical file with all work completed and with proper cover.

3. Read the chapters thoroughly and Complete their exercise based questions (chapters from unit I and unit II). And also learn them.

4. Prepare one exhibit for virtual science exhibition.

SUBJECT: PROMOTION OF TOYS AS A TOOL FOR EDUCATION

THEME:-

HEALTH HAZARDS/TECHNOLOGY

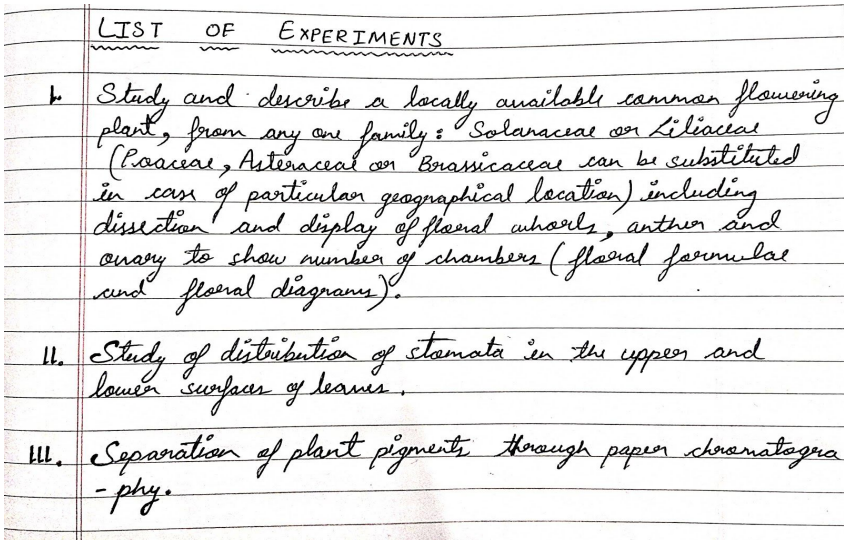
1. A model or a working model

2. Video explaning the presentation (topic)

3. PowerPoint presentation

4. Write up in pdf

I. Note down important terms and write their definitions from all nine chapters.(1,2,3,4,5,7,8,9,10)
II. Draw well labelled diagram from all nine chapters and write functions of all parts.
III. Complete all the written assignments.
IV. Complete NCERT exercises of all the nine chapters.
V. Read all the nine chapters thoroughly and note down all the difficulties for discussion in online classes.
VI. Study and solve questions with the help of Diksha App.
VII. Complete the experiments in practical file, from OLABS.

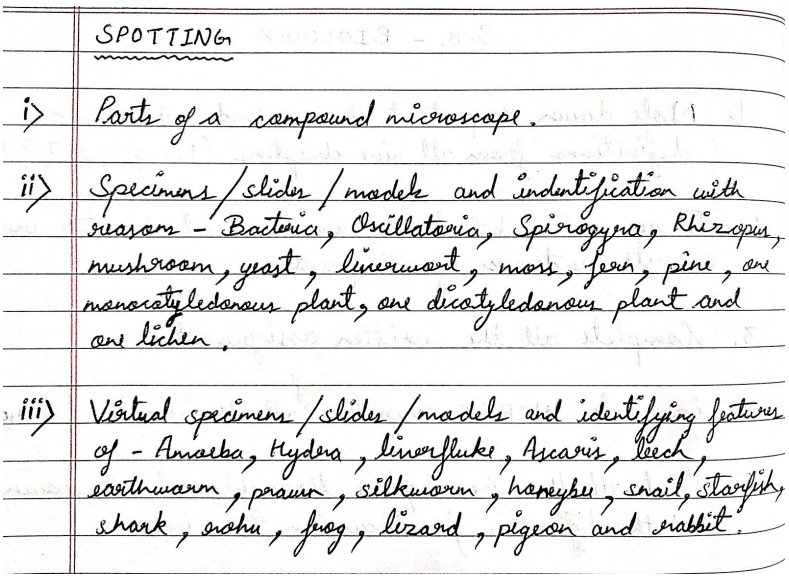


LIST OF EXPERIMENTS

I. Study and describe a locally available common flowering plant, from any one family: Solanaceae or Liliaceae (Poaceae, Asteraceae or Brassicaceae can be substituted in case of particular geographical location) including dissection and display of floral whorls, anther and ovary to show number of chambers (floral formulae and floral diagrams).

II. Study of distribution of stomata in the upper and lower surfaces of leaves.

III. Separation of plant pigments through paper chromatography.



SPOTTING

i) Parts of a compound microscope.

ii) Specimens / slides / models and identification with reason - Bacteria, Oscillatoria, Spirogyra, Rhizopus, mushroom, yeast, liverwort, moss, fern, pine, one monocotyledonous plant, one dicotyledonous plant and one lichen.

iii) Virtual specimens / slides / models and identifying features of - Amoeba, Hydra, liverfluke, Ascaris, leech, earthworm, prawn, silkworm, honeybee, snail, starfish, shark, rohu, frog, lizard, pigeon and rabbit.

Autumn Break Assignment 2020-2021

XI-COMPUTER SCIENCE

KENDRIYA VIDYALAYA NO 1
ARMAPUR,KANPUR

Python Basics Assignment

1. Explain any four features of Python.
2. What is IDLE?
3. What are the two modes of Python. Name them.
4. Name any four application areas of Python
5. What is print() in Python?
6. What are the Python tokens? Name them.
7. Identify the keywords from the following:
   (i) from (ii) AND (iii) continue (iv) import (v) elif (vi) IN (vii) else (viii) true
8. Consider the following Python code:
   >>>print("Hello World")
   Write a statement in Python to insert a comment for the above.
9. Identify the type of constants from the following:
   (i) "Hello" (ii) 24 (iii) "Good Morning" (iv)"90.90" (v)"##$$" (vi) 40.89
   .
10. Write Python command to display a message on the screen
11. What are Escape Sequences in Python. Give examples
    .

ANSWERS

1. Four features of Python:
   a. Open Source: Python is open source and free.
   Source code is easily accessible and can be freely modified and re-distributed
   b. Portable: Python is platform independent. It can run on Windows. Mac OS and Linux alike
   c. Powerful: Supports dynamic data typing. It has a large standard library that supports many common programming tasks
   d. **Easy to Use & Learn:**Its easy to download and install Python. Also the structure and syntax are very simple and easy to understand
2. IDLE is the default IDE of Python. It stands for Integrated Development and Learning Environment.
3. Two modes of working with IDLE are: Interactive mode and Script mode.
   .
4. Four application areas of Python:
   a. Web development
   b. Machine Learning
   c. Artificial Intelligence
   d. Data Science

5. The print() is a function to display the specified content on screen.
6. Python has some basic building blocks, called tokens. These are

a. Python character set
b. Keywords
c. Comments
d. Constants
e. Operators
f. Variables
g. Data Types

7. . The keywords are : (i)from , (iii) continue , (iv) import , (v) elif and (vii) else

8. >>>print(“Hello World”) #This is a comment

9. (i)"Hello" Character constant
(ii) 24 Integer constant
(iii) “Good Morning” Character constant
(iv)”90.90” Character constant
(v)”##$$” Character constant
(vi) 40.89 Decimal constant

10. print(“Good Morning”)

11.These are special constants which have a special functionality attached to them. Example, ‘\n’ for newline , ‘\t’ for eight spaces in output

WORKSHEET WITH SOLUTION

PYTHON – REVISION TOUR

1	'Welcome' is _____ literals
Ans.	string
2	$ symbol can be used in naming an identifier (True/False)
Ans.	False
3	Write any 2 data types available in Python
Ans.	int, bool
4	**'Division by zero'** is an example of _____ error.
Ans.	Runtime Error
5	**range(1,10)** will return values in the range of _____ to _____
Ans.	**1 to 9**
6	**randint(1,10)** will return values in the range of _____ to _____
Ans.	**1 to 10**
7	"Computer Science"[0:6] = _____ "Computer Science"[3:10] = _____ "Computer Science"[::-1] = _____ "Computer Science"[-8:]= _____
Ans.	"Computer Science"[0:6] = Comput "Computer Science"[3:10] = puter S "Computer Science"[::-1] = ecneicS retupmoC "Computer Science"[-8:] = Science
8	**Output of :** print("Ok"*4 + "Done")
Ans.	**OkOkOkOkDone**
9	**Output of :** print(print("Why?"))
Ans.	**Why?** **None**
10	Raj was working on application where he wanted to divide the two number (A and B) , he has written the expression as C = A/B, on execution he entered 30 and 7 and expected answer was 4 i.e. only integer part not in decimal, but the answer was 4.285 approx, help Raj to correct his expression and achieving the desired output. **Correct Expression :** _____
Ans.	C = A//B
11	**Can you guess the output?** C = -11%4 print(C)
Ans.	**1**

12	Write 2 advantages and disadvantages of Python programming language
Ans.	Advantages 1) Easy to Use 2) Expressive Language Disadvantages 1) Slow because of interpreted 2) Not strong on type binding
13	**Identify the valid and Invalid identifiers names:** Emp-Code, _bonus, While, SrNo. , for, #count, Emp1, 123Go, Bond007
Ans.	**Valid: _bonus, While, Emp1,Bond007** **Invalid : Emp-code, SrNo., for,#count,123Go**
14	**Identify the type of literals for each:** (i) 123 (ii) 'Hello' (iii) 'Bye\nSee You' (iv) 'A' (v) 345.55 (vi) 10+4j (vii) 0x12
Ans.	**(i) Int** **(ii) String** **(iii) String** **(iv) String** **(v) Float** **(vi) Complex** **(vii) Int**
15	**What is the size of each string?** (i) 'Python' (ii) 'Learning@\nCS' (iii) '\table'
Ans.	**(i) 6** **(ii) 12** **(iii) 5**
16	**Output of :** (i) True + True = (ii) 100 + False = (iii) -1 + True = (iv) bool(-1 + True) =
Ans.	**(i) 2** **(ii) 100** **(iii) 0** **(iv) False**
17	**Output of** (i) 2 * 7 = _____ (ii) 2 ** 7 = _____ (iii) 2**2**3 = _____ (iv) 17 % 20 = _____ (v) not(20>6) or (19>7) and (20==20) = ____
Ans.	**(i) 14** **(ii) 128** **(iii) 256** **(iv) 17** **(v) True**

18	**Output of :** a,b,c = 20,40,60 b+=10 c+=b print(a,b,c)
Ans.	**20 50 110**
19	Write a program to enter 2 number and find sum and product
Ans.	n1 = int(input('Enter num1 ')) n2 = int(input('Enter num2 ')) s = n1 + n2 p = n1 * n2 print('Sum=',s) print('Product =',p)
20	Write a program to enter temperature in Fahrenheit and convert it in Celsius
Ans.	f = int(input('Enter temperature (Fahrenheit) ')) c = (f-32)*5/9 print('Celcus =',c)
21	Write a program to enter any money and find out number of denominations can be used to make that money. For e.g. if the money entered is 2560 Then output should be 2000 = 1 500 = 1 200 = 0 100 =0 50 =1 20 = 0 10 = 1 5 = 0 2 = 0 1 = 0 Hint : use % and // operator (Without Loop / Recursion)
Ans.	amount = int(input('Enter Amount ')) n2000 = amount//2000 amount = amount % 2000 n500 = amount//500 amount = amount % 500 n200 = amount//200 amount = amount %200 n100 = amount//100 amount = amount %100 n50 = amount//50 amount = amount %50 n20 = amount//20 amount = amount %20 n10 = amount // 10 amount = amount %10 n5 = amount // 5 amount = amount % 5 n2 = amount//2 amount = amount % 2

	n1 = amount//1 amount = amount % 1 print('2000=',n2000) print('500=',n500) print('200=',n200) print('100=',n100) print('50=',n50) print('20=',n20) print('10=',n10) print('5=',n5) print('2=',n2) print('1=',n1)
22	**Consider a list:** MyFamily = [“Father”,”Mother”,”Brother”,”Sister”,”Jacky”] a) write statement to print “Brother” b) write statement to print all items of list in reverse order c) write statement to check “Sister” is in MyFamily or not d) write statement to update “Jacky” with “Tiger” e) write statement remove “Jacky” from MyFamily and also print it f) write statement to add “Tommy” in MyFamily at the end
Ans.	**a) print(MyFamily[2])** **b) print(MyFamily[::-1])** **c) 'Sister' in MyFamily** **d) MyFamily[len(MyFamily)-1]='Tiger'** **OR** **MyFamily[4]=’Tiger’** **e) MyFamily.pop()** **f) MyFamily.append(‘Tommy’)**
23	**Consider a Tuple:** Record = (10,20,30,40) Raj wants to add new item 50 to tuple, and he has written expression as Record = Record + 50, but the statement is giving an error, Help Raj in writing correct expression. **Correct Expression : _____**
Ans.	**Record = Record + (50,)**
24	What is the difference between List and Tuple?
Ans.	List is mutable type whereas Tuple is Immutable.
25	What is the difference between List and String?
Ans.	List is mutable type whereas String is immutable. List can store elements of any type like-string, list, tuple, etc. whereas String can store element of character type only.
26	What is ordered and unordered collection? Give example of each
Ans.	Ordered collection stores every elements at index position starts from zero like List, Tuples, string whereas unordered collection stores elements by assigning key to each value not by index like dictionary
27	Consider a Dictionary Employee = {‘Empno’:1,’Name’:’Snehil’,’Salary’:80000}

	Write statements: (i) to print employee name (ii) to update the salary from 80000 to 90000 (iii) to get all the values only from the dictionary
Ans.	(i) print(Employee['Name']) (ii) Employee['Salary']=90000 (iii) print(Employee.values())
28	Num = 100 Isok = False print(type(Num)) = _____ print(type(Isok)) = _____
Ans.	<class 'int'> <class 'bool'>
29	**Name the Python Library module which need to be imported to invoke the following function:** a) floor() b) randrange() c) randint() d) sin()
Ans.	**a) math** **b) random** **c) random** **d) math**
30	**Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code.** 30=To for K in range(0,To) IF k%4==0: print (K*4) Else: print (K+3)
Ans.	**To=30** **for K in range(0,To):** **if K%4==0:** **print(K*4)** **else:** **print(K+3)**
31	**Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code:** a=5 work=true b=hello c=a+b FOR i in range(10) if i%7=0: continue
Ans.	**a=5** **work=True** **b='hello'**

	c = a + b **for i in range(10):** **if i%7==0:** **continue**
32	Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code: for Name in [Ramesh,Suraj,Priya] IF Name[0]='S': print(Name)

Ans.	for Name in ['Ramesh','Suraj','Priya']:
	if Name[0]=='S':
	print(Name)

33	**Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code:** a=b=10 c=a+b While c=<20: print(c,END="*") c+=10
Ans.	a=b=10 c=a+b while c<=20: print(c,end="*") c+=10
34	**Choose the correct possible answer(s)** a = random.randint(1,5) b = random.randint(1,3) c = random.randint(2,6) print(a,b,c) (i) 2 1 3 (ii) 4 4 4 (iii) 3 2 1 (iv) 5 3 5
Ans.	**(i) (iv)**
35	What is type conversion in Python? What are different types of conversion? Illustrate with example.

Ans.	Type conversion refers to conversion of one data type to another data type for e.g. string is converted to int. There are 2 types of conversion:
	1) **Implicit:** in this of conversion, it is automatically done by the interpreter without user intervention.
	Example:
	Num = [10,20,30]
	print(type(Num[1])) # int
	Num[1] = Num[1] + 4.5 # it will automatically convert to float
	Print(type(Num[1])) # float
	2) **Explicit:** in this type of conversion, user will convert any type of value to its desired type. For example string to int.
	Example:
	num = int(input('Enter number '))
	#in the above code input of string type will be converted explicitly in int.

36	**Fill in the blanks to execute infinite loop:** while _____: print("spinning")

Ans.	**while True:** **print("spinning")**
37	Write a program to enter any number and check it is divisible by 7 or not

Ans.	num = int(input('Enter any number '))
	if num % 7 == 0:
	print('Divisible by 7')
	else:
	print('Not divisible by 7')

38	**Fill in the blanks to execute loop from 10 to 100 and 10 to 1** (i) for i in range(_____): print(i) (ii) for i in range(_____): print(i)

Ans.	**(i)**
	for i in range(10,101):
	print(i)
	(ii)
	for i in range(10,0,-1):
	print(i)

39	**What will be the output if entered number (n) is 10 and 11**
	i=2
	while i<n:
	if num % i==0:
	break
	print(i)
	i=i+1
	else:
	print("done")

Ans.	**If n is 10 then when program control enter in loop the if condition will be satisfied and break will execute cause loop to terminate. The else part of while will also be not executed because loop terminated by break. (NO OUTPUT)** **If n is 11 it will print 2 to 10 and then it will execute else part of while loop and print 'done' because loop terminate normally without break**

40	**What will be the difference in output**
	(i)
	for i in range(1,10):
	if i % 4 == 0:
	break
	print(i)
	
	(ii)
	
	for i in range(1,10):
	if i % 4 == 0:

```
            continue
      print(i)
```

Ans.

(i)
1
2
3
(ii)
1
2
3
5
6
7
9
10

41

What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the maximum values that can be assigned to each of the variables FROM and TO.

```
import random
AR=[20,30,40,50,60,70];
FROM=random.randint(1,3)
TO=random.randint(2,4)
for K in range(FROM,TO+1):
      print (AR[K],end="#")
```

(i) 10#40#70# (ii) 30#40#50#
(iii) 50#60#70# (iv) 40#50#70#

Ans.

Maximum Value of FROM = 3
Maximum Value of TO = 4
Output : (ii)

42

What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the minimum and maximum value that can be assigned to the variable PICKER.

```
import random
PICKER=random.randint(0,3)
COLORS=["BLUE","PINK","GREEN","RED"]
for I in COLORS:
      for J in range(1,PICKER):
            print(I,end="")
      print()
```

(i)	(ii)
BLUE PINK GREEN RED	BLUE BLUEPINK BLUEPINKGREEN BLUEPINKGREENRED
(iii)	**(iv)**
PINK PINKGREEN PINKGREENRED	BLUEBLUE PINKPINK GREENGREEN REDRED

Ans.

Minimum Value of PICKER = 0
Maximum Value of PICKER = 3
Output: (i) and (iv)

43

What are the correct ways to generate numbers from 0 to 20

	range(20) (ii) range(0,21) (iii) range(21) (iv) range(0,20)
Ans.	**(ii) And (iii)**
44	**Which is the correct form of declaration of dictionary?** (i) Day={1:'monday',2:'tuesday',3:'wednesday'} (ii) Day=(1;'monday',2;'tuesday',3;'wednesday') (iii) Day=[1:'monday',2:'tuesday',3:'wednesday'] (iv) Day={1'monday',2'tuesday',3'wednesday']
Ans.	**(i)**
45	**Choose the correct declaration from the following code:** Info = ({'roll':[1,2,3],'name':['amit','sumit','rohit']}) List (ii) Dictionary (iii) String (iv) Tuple
Ans.	**(iv) Tuple**
46	**Which is the valid dictionary declaration?** i) d1={1:'January',2='February',3:'March'} ii) d2=(1:'January',2:'February',3:'March'} iii) d3={1:'January',2:'February',3:'March'} iv) d4={1:January,2:February,3:March}
Ans.	**(iii)**
47	**What is/are not true about Python's Dictionary?** (i) Dictionaries are mutable (ii) Dictionary items can be accessed by their index position (iii) No two keys of dictionary can be same (iv) Dictionary keys must be of String data type
Ans.	**(ii) and (iv)**

48	x="abAbcAba"
	for w in x:
	  if w=="a":
	  print("*")
	  else:
	  print(w)

Ans.	* b A b c A b *
49	**Convert the following 'for' loop using 'while' loop** for k in range (10,20,5): print(k)

Ans.	**k = 10**
	while k<=20:
	  print(k)
	  k+=5

50	**Give Output** colors=["violet", "indigo", "blue", "green", "yellow", "orange", "red"] del colors[4]

	colors.remove("blue") p=colors.pop(3) print(p, colors)
Ans.	**orange ['violet', 'indigo', 'green', 'red']**

51	**Output of following code:**
	A=10
	B=15
	S=0
	while A<=B:
	  S = A + B
	  A = A + 10
	  B = B + 10
	  if A>=40:
	  A = A + 100
	print(S)

Ans.	**65**

52	**Output of the following code:**
	X = 17
	if X>=17:
	  X+=10
	else:
	  X-=10
	print(X)

Ans.	**27**
53	**How many times loop will execute:** P=5 Q=35 while P<=Q: P+=6
Ans.	**6 times**

54	**Find and write the output of the following python code:**
	Msg="CompuTer"
	Msg1=''
	for i in range(0, len(Msg)):
	  if Msg[i].isupper():
	  Msg1=Msg1+Msg[i].lower()
	elif i%2==0:
	  Msg1=Msg1+'*'
	  else:
	  Msg1=Msg1+Msg[i].upper()
	print(Msg1)

Ans.	**cO*P*t*R**
55	A=10 B=10 print(A == B) = ? print(id(A) == id(B) = ? print(A is B) = ?
Ans.	True True True

1. Explain any three merits and three demerits of Python.
2. Give full form of Python's IDLE.
3. What do you mean by identifiers? Give any four rules to define an identifier.

What do you mean by comments? How will you add inline, single line or multiline comments in Python?

4. What is a block in python? How is a block created in Python, explain with example?
5. What do you mean by lvalue and rvalue? Give an example.
6. What are the core data types in Python?
7. "Strings are not mutable". Explain.
8. Compare strings, lists and tuples.
9. Differentiate Selection and iteration.
10. Write a program to find out whether a given year is leap year.
11. Write a program to calculate and print the roots of quadratic equation $\mathbf{ax^2+bx+c=0}$. The program should display suitable message whether roots are real, equal, different or imaginary.
12. Write a program to calculate electricity charges based on number of consumed electricity units as per following conditions:

Units	Charges
Upto 100	Rs. 2 per unit
101 - 200	Rs. 200 + Rs. 3.5 per unit for units exceeding 100
201 - 300	Rs. 550 + Rs. 7.5 per unit for units exceeding 200
301 & above	Rs. 1300 + Rs. 9 per unit for units exceeding 300

13. Write a program to calculate BMI of a person after inputting its weight in kgs and height in meters and then print the nutritional status as per following table :

14. Nutritional Status	15. WHO criteria BMI cut-off
16. Underweight	17. less than 18.5
18. Normal	19. 18.5 to 24.9
20. Overweight	21. 25 – 29.9
22. Obese	23. 30 or above

Formula to calculate **BMI = weight in Kgms./ (height in meter)^2**

14. Rewrite the following code fragment using while loop:

```
min = 0
max= num
if num < 0 :
    min = num
    max = 0
    for i  in range(min, max +1):
        sum +=i
```

15. Predict the output of the following code if value of a is entered as 5:

```
a = int( input("Enter break code ")) # line first
num = 10
while num> 0:
    sum += num
    num -= 2
    if num < a :
        break;
else :
    sum+= num
print( sum)
```

16. Write a program in Python with the help of loops to find out the substrings of a given string.

For eg, input of 'Cat' should display:

C Ca Cat a at t

Number Conversions Assignment

Convert the following numbers to base 10-

1. $(10010)_2$
2. $(254)_8$
3. $(AC)_{16}$
4. $(10010.101)_2$
5. $(254.7014)_8$
6. $(AC.FBA5)_{16}$
7. $(0.1402)_8$
8. $(0.ABDF)_{16}$

Convert the following numbers from base 10 to base 2-

1. $(18)_{10}$
2. $(18.625)_{10}$
3. $(172)_{10}$
4. $(172.878)_{10}$

Convert the following numbers from base 10 to base 8-

1. $(1032)_{10}$
2. $(1032.6875)_{10}$
3. $(172)_{10}$
4. $(172.878)_{10}$

Mixed Problems:

1. Convert $(1056)_{16}$ to $(?)_8$
2. Convert $(11672)_8$ to $(?)_{16}$
3. Convert $(2724)_8$ to $(?)_2$
4. Convert $(3211)_{16}$ to $(?)_2$

Assignment on Boolean Expressions and Logic Circuits

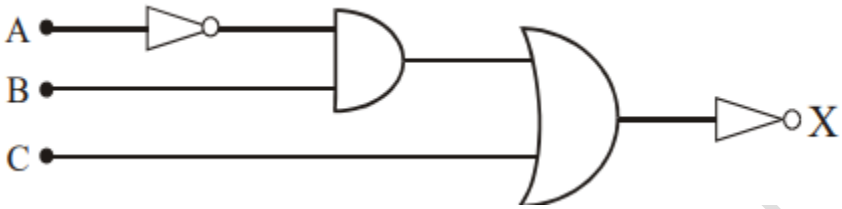
1. Given the following Boolean function:

F = x y ‘z + x’ y z + w x ‘y + w’ x y

(a) Draw the truth table of the function.

(b) Draw the logic diagram using the Boolean expression.

2. Given the following logic diagram:



(a) Wrtie the equivaletnt expression for the logic diagram.

(b) Draw the truth table of the expression obtained in part (a).

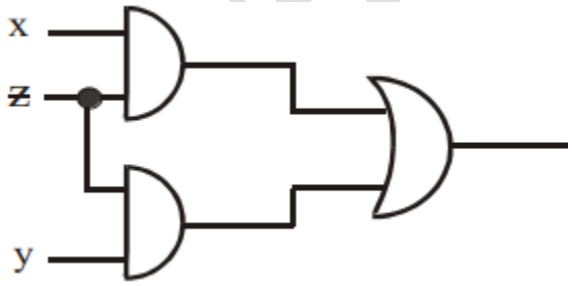
3. Given the following Boolean function:

F= A(B + C’)

(a) Draw the truth table of the function.

(b) Draw the logic diagram using the Boolean expression.

4. Given the following logic diagram:



(a) Wrtie the equivaletnt expression for the logic diagram.

(b) Draw the truth table of the expression obtained in part (a).

5. Draw thr truth tables for the following:

(i) XYZ + X’ Y’ Z’

CHANDER MITTAL, SRDAV

(ii) ABC + A ‘ B ‘ C +A’ B’ C’

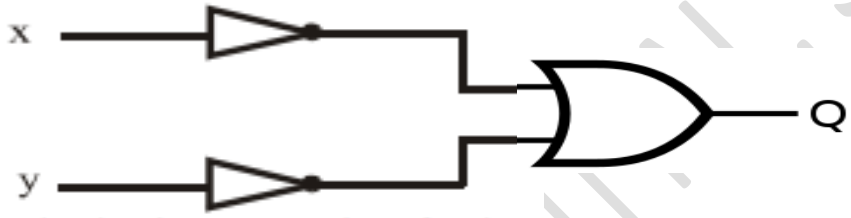
(iii) (A + D) (B + C)

(iv) (A + B) (A +C)(A’ + B’)

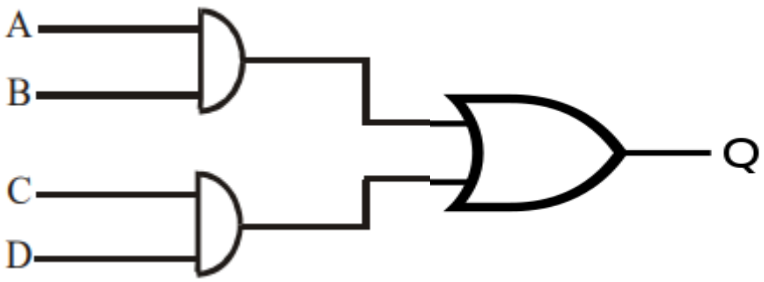
6. Obtain boolean expression for the following logic circuits:

a.

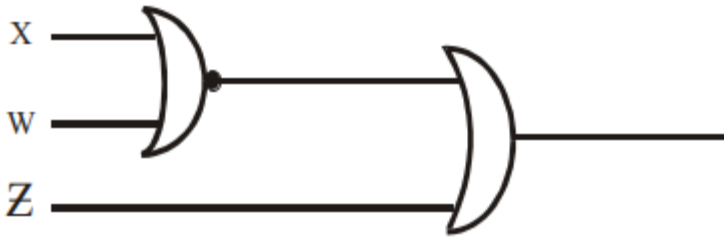
b.



c.



d.



7. Construct a logic diagram for expressions

a. A. B + C

b. A'B + A' .B'

c. A. B + B.C

d. B. (A +C)

e. X + Y = Y + X

f. XY= YX

g. X(X +Y) = X

h. X + X Z ` = X

CS BY NEERU MITTAL, SRDAV

KENDRIYA VIDYALAYA NO.1 ARMAPUR, KANPUR

AUTUMN BREAK 2020-21

CLASS-XI , SUBJECTS- ECONOMICS

Q.1 Write three limitations of Statistics.

Q.2 Draw PPC and show the followings: -

(a) Full employment of resources,
(b) Underutilization of resources, and
(c) Growth of resources

Q.3 **Why is there a need for economizing of resources?**

Q.4 Explain the relationship between marginal utility and total utility.

Q.5 Why more amount of a commodity is demanded at a lower price.? Explain.

Q.6 Define MRT. Explain MRT with the help of a numerical example.

Q.7 Economic slowdown in some parts of the world has adversely affected demand for Indian exports. What will be its effect on the production possibilities frontier of India? Explain.

Q.8 What is the difference between change in demand and change in quantity demanded. .Use Diagram.

Q.9 A consumer consumes only two goods? Why consumer in equilibrium when he buys only that combination of the two goods that is shown at the point of tangency of the budget line with an indifference curve? Explain.

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Autumn Break Assignment 2020-2021

XI-COMPUTER SCIENCE / IP

KENDRIYA VIDYALAYA NO 1
ARMAPUR,KANPUR

Python Basics Assignment

1. Explain any four features of Python.
2. What is IDLE?
3. What are the two modes of Python. Name them.
4. Name any four application areas of Python
5. What is print() in Python?
6. What are the Python tokens? Name them.
7. Identify the keywords from the following:
   (i) from (ii) AND (iii) continue (iv) import (v) elif (vi) IN (vii) else (viii) true
8. Consider the following Python code:
   >>>print("Hello World")
   Write a statement in Python to insert a comment for the above.
9. Identify the type of constants from the following:
   (i) "Hello" (ii) 24 (iii) "Good Morning" (iv)"90.90" (v)"##$$" (vi) 40.89
   .
10. Write Python command to display a message on the screen
11. What are Escape Sequences in Python. Give examples
    .

ANSWERS

1. Four features of Python:
   a. Open Source: Python is open source and free.
   Source code is easily accessible and can be freely modified and re-distributed
   b. Portable: Python is platform independent. It can run on Windows. Mac OS and Linux alike
   c. Powerful: Supports dynamic data typing. It has a large standard library that supports many common programming tasks
   d. **Easy to Use & Learn:**Its easy to download and install Python. Also the structure and syntax are very simple and easy to understand
2. IDLE is the default IDE of Python. It stands for Integrated Development and Learning Environment.
3. Two modes of working with IDLE are: Interactive mode and Script mode.
   .
4. Four application areas of Python:
   a. Web development
   b. Machine Learning
   c. Artificial Intelligence
   d. Data Science

5. The print() is a function to display the specified content on screen.
6. Python has some basic building blocks, called tokens. These are

a. Python character set
b. Keywords
c. Comments
d. Constants
e. Operators
f. Variables
g. Data Types

7. . The keywords are : (i)from , (iii) continue , (iv) import , (v) elif and (vii) else

8. >>>print(“Hello World”) #This is a comment

9. (i)"Hello" Character constant
(ii) 24 Integer constant
(iii) “Good Morning” Character constant
(iv)”90.90” Character constant
(v)”##$$” Character constant
(vi) 40.89 Decimal constant

10. print(“Good Morning”)

11.These are special constants which have a special functionality attached to them. Example, ‘\n’ for newline , ‘\t’ for eight spaces in output

WORKSHEET WITH SOLUTION

PYTHON – REVISION TOUR

1	'Welcome' is _____ literals
Ans.	string
2	$ symbol can be used in naming an identifier (True/False)
Ans.	False
3	Write any 2 data types available in Python
Ans.	int, bool
4	**'Division by zero'** is an example of _____ error.
Ans.	Runtime Error
5	**range(1,10)** will return values in the range of _____ to _____
Ans.	**1 to 9**
6	**randint(1,10)** will return values in the range of _____ to _____
Ans.	**1 to 10**
7	"Computer Science"[0:6] = _____ "Computer Science"[3:10] = _____ "Computer Science"[::-1] = _____ "Computer Science"[-8:]= _____
Ans.	"Computer Science"[0:6] = Comput "Computer Science"[3:10] = puter S "Computer Science"[::-1] = ecneicS retupmoC "Computer Science"[-8:] = Science
8	**Output of :** print("Ok"*4 + "Done")
Ans.	**OkOkOkOkDone**
9	**Output of :** print(print("Why?"))
Ans.	**Why?** **None**
10	Raj was working on application where he wanted to divide the two number (A and B) , he has written the expression as C = A/B, on execution he entered 30 and 7 and expected answer was 4 i.e. only integer part not in decimal, but the answer was 4.285 approx, help Raj to correct his expression and achieving the desired output. **Correct Expression :** _____
Ans.	C = A//B
11	**Can you guess the output?** C = -11%4 print(C)
Ans.	**1**

12	Write 2 advantages and disadvantages of Python programming language
Ans.	Advantages 1) Easy to Use 2) Expressive Language Disadvantages 1) Slow because of interpreted 2) Not strong on type binding
13	**Identify the valid and Invalid identifiers names:** Emp-Code, _bonus, While, SrNo. , for, #count, Emp1, 123Go, Bond007
Ans.	**Valid: _bonus, While, Emp1,Bond007** **Invalid : Emp-code, SrNo., for,#count,123Go**
14	**Identify the type of literals for each:** (i) 123 (ii) 'Hello' (iii) 'Bye\nSee You' (iv) 'A' (v) 345.55 (vi) 10+4j (vii) 0x12
Ans.	**(i) Int** **(ii) String** **(iii) String** **(iv) String** **(v) Float** **(vi) Complex** **(vii) Int**
15	**What is the size of each string?** (i) 'Python' (ii) 'Learning@\nCS' (iii) '\table'
Ans.	**(i) 6** **(ii) 12** **(iii) 5**
16	**Output of :** (i) True + True = (ii) 100 + False = (iii) -1 + True = (iv) bool(-1 + True) =
Ans.	**(i) 2** **(ii) 100** **(iii) 0** **(iv) False**
17	**Output of** (i) 2 * 7 = _____ (ii) 2 ** 7 = _____ (iii) 2**2**3 = _____ (iv) 17 % 20 = _____ (v) not(20>6) or (19>7) and (20==20) = ____
Ans.	**(i) 14** **(ii) 128** **(iii) 256** **(iv) 17** **(v) True**

18	**Output of :** a,b,c = 20,40,60 b+=10 c+=b print(a,b,c)
Ans.	**20 50 110**
19	Write a program to enter 2 number and find sum and product
Ans.	n1 = int(input('Enter num1 ')) n2 = int(input('Enter num2 ')) s = n1 + n2 p = n1 * n2 print('Sum=',s) print('Product =',p)
20	Write a program to enter temperature in Fahrenheit and convert it in Celsius
Ans.	f = int(input('Enter temperature (Fahrenheit) ')) c = (f-32)*5/9 print('Celcus =',c)
21	Write a program to enter any money and find out number of denominations can be used to make that money. For e.g. if the money entered is 2560 Then output should be 2000 = 1 500 = 1 200 = 0 100 =0 50 =1 20 = 0 10 = 1 5 = 0 2 = 0 1 = 0 Hint : use % and // operator (Without Loop / Recursion)
Ans.	amount = int(input('Enter Amount ')) n2000 = amount//2000 amount = amount % 2000 n500 = amount//500 amount = amount % 500 n200 = amount//200 amount = amount %200 n100 = amount//100 amount = amount %100 n50 = amount//50 amount = amount %50 n20 = amount//20 amount = amount %20 n10 = amount // 10 amount = amount %10 n5 = amount // 5 amount = amount % 5 n2 = amount//2 amount = amount % 2

	n1 = amount//1 amount = amount % 1 print('2000=',n2000) print('500=',n500) print('200=',n200) print('100=',n100) print('50=',n50) print('20=',n20) print('10=',n10) print('5=',n5) print('2=',n2) print('1=',n1)
22	**Consider a list:** MyFamily = [“Father”,”Mother”,”Brother”,”Sister”,”Jacky”] a) write statement to print “Brother” b) write statement to print all items of list in reverse order c) write statement to check “Sister” is in MyFamily or not d) write statement to update “Jacky” with “Tiger” e) write statement remove “Jacky” from MyFamily and also print it f) write statement to add “Tommy” in MyFamily at the end
Ans.	**a) print(MyFamily[2])** **b) print(MyFamily[::-1])** **c) 'Sister' in MyFamily** **d) MyFamily[len(MyFamily)-1]='Tiger'** **OR** **MyFamily[4]=’Tiger’** **e) MyFamily.pop()** **f) MyFamily.append(‘Tommy’)**
23	**Consider a Tuple:** Record = (10,20,30,40) Raj wants to add new item 50 to tuple, and he has written expression as Record = Record + 50, but the statement is giving an error, Help Raj in writing correct expression. **Correct Expression : _____**
Ans.	**Record = Record + (50,)**
24	What is the difference between List and Tuple?
Ans.	List is mutable type whereas Tuple is Immutable.
25	What is the difference between List and String?
Ans.	List is mutable type whereas String is immutable. List can store elements of any type like-string, list, tuple, etc. whereas String can store element of character type only.
26	What is ordered and unordered collection? Give example of each
Ans.	Ordered collection stores every elements at index position starts from zero like List, Tuples, string whereas unordered collection stores elements by assigning key to each value not by index like dictionary
27	Consider a Dictionary Employee = {‘Empno’:1,’Name’:’Snehil’,’Salary’:80000}

	Write statements: (i) to print employee name (ii) to update the salary from 80000 to 90000 (iii) to get all the values only from the dictionary
Ans.	(i) print(Employee['Name']) (ii) Employee['Salary']=90000 (iii) print(Employee.values())
28	Num = 100 Isok = False print(type(Num)) = _____ print(type(Isok)) = _____
Ans.	<class 'int'> <class 'bool'>
29	**Name the Python Library module which need to be imported to invoke the following function:** a) floor() b) randrange() c) randint() d) sin()
Ans.	**a) math** **b) random** **c) random** **d) math**
30	**Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code.** 30=To for K in range(0,To) IF k%4==0: print (K*4) Else: print (K+3)
Ans.	**To=30** **for K in range(0,To):** **if K%4==0:** **print(K*4)** **else:** **print(K+3)**
31	**Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code:** a=5 work=true b=hello c=a+b FOR i in range(10) if i%7=0: continue
Ans.	**a=5** **work=True** **b='hello'**

	c = a + b **for i in range(10):** **if i%7==0:** **continue**
32	Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code: for Name in [Ramesh,Suraj,Priya] IF Name[0]='S': print(Name)

Ans.	for Name in ['Ramesh','Suraj','Priya']:
	if Name[0]=='S':
	print(Name)

33	**Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code:** a=b=10 c=a+b While c=<20: print(c,END="*") c+=10
Ans.	a=b=10 c=a+b while c<=20: print(c,end="*") c+=10
34	**Choose the correct possible answer(s)** a = random.randint(1,5) b = random.randint(1,3) c = random.randint(2,6) print(a,b,c) (i) 2 1 3 (ii) 4 4 4 (iii) 3 2 1 (iv) 5 3 5
Ans.	**(i) (iv)**
35	What is type conversion in Python? What are different types of conversion? Illustrate with example.

Ans.	Type conversion refers to conversion of one data type to another data type for e.g. string is converted to int. There are 2 types of conversion:
	1) **Implicit:** in this of conversion, it is automatically done by the interpreter without user intervention.
	Example:
	Num = [10,20,30]
	print(type(Num[1])) # int
	Num[1] = Num[1] + 4.5 # it will automatically convert to float
	Print(type(Num[1])) # float
	2) **Explicit:** in this type of conversion, user will convert any type of value to its desired type. For example string to int.
	Example:
	num = int(input('Enter number '))
	#in the above code input of string type will be converted explicitly in int.

36	**Fill in the blanks to execute infinite loop:** while _____: print("spinning")

Ans.	**while True:** **print("spinning")**
37	Write a program to enter any number and check it is divisible by 7 or not

Ans.	num = int(input('Enter any number '))
	if num % 7 == 0:
	print('Divisible by 7')
	else:
	print('Not divisible by 7')

38	**Fill in the blanks to execute loop from 10 to 100 and 10 to 1** (i) for i in range(_____): print(i) (ii) for i in range(_____): print(i)

Ans.	**(i)**
	for i in range(10,101):
	print(i)
	(ii)
	for i in range(10,0,-1):
	print(i)

39	**What will be the output if entered number (n) is 10 and 11**
	i=2
	while i<n:
	if num % i==0:
	break
	print(i)
	i=i+1
	else:
	print("done")

Ans.	**If n is 10 then when program control enter in loop the if condition will be satisfied and break will execute cause loop to terminate. The else part of while will also be not executed because loop terminated by break. (NO OUTPUT)** **If n is 11 it will print 2 to 10 and then it will execute else part of while loop and print 'done' because loop terminate normally without break**

40	**What will be the difference in output**
	(i)
	for i in range(1,10):
	if i % 4 == 0:
	break
	print(i)
	
	(ii)
	
	for i in range(1,10):
	if i % 4 == 0:

```
            continue
      print(i)
```

Ans.

(i)
1
2
3
(ii)
1
2
3
5
6
7
9
10

41

What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the maximum values that can be assigned to each of the variables FROM and TO.

```
import random
AR=[20,30,40,50,60,70];
FROM=random.randint(1,3)
TO=random.randint(2,4)
for K in range(FROM,TO+1):
      print (AR[K],end="#")
```

(i) 10#40#70# (ii) 30#40#50#
(iii) 50#60#70# (iv) 40#50#70#

Ans.

Maximum Value of FROM = 3
Maximum Value of TO = 4
Output : (ii)

42

What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the minimum and maximum value that can be assigned to the variable PICKER.

```
import random
PICKER=random.randint(0,3)
COLORS=["BLUE","PINK","GREEN","RED"]
for I in COLORS:
      for J in range(1,PICKER):
            print(I,end="")
      print()
```

(i)	(ii)
BLUE PINK GREEN RED	BLUE BLUEPINK BLUEPINKGREEN BLUEPINKGREENRED
(iii)	**(iv)**
PINK PINKGREEN PINKGREENRED	BLUEBLUE PINKPINK GREENGREEN REDRED

Ans.

Minimum Value of PICKER = 0
Maximum Value of PICKER = 3
Output: (i) and (iv)

43

What are the correct ways to generate numbers from 0 to 20

	range(20) (ii) range(0,21) (iii) range(21) (iv) range(0,20)
Ans.	**(ii) And (iii)**
44	**Which is the correct form of declaration of dictionary?** (i) Day={1:'monday',2:'tuesday',3:'wednesday'} (ii) Day=(1;'monday',2;'tuesday',3;'wednesday') (iii) Day=[1:'monday',2:'tuesday',3:'wednesday'] (iv) Day={1'monday',2'tuesday',3'wednesday']
Ans.	**(i)**
45	**Choose the correct declaration from the following code:** Info = ({'roll':[1,2,3],'name':['amit','sumit','rohit']}) List (ii) Dictionary (iii) String (iv) Tuple
Ans.	**(iv) Tuple**
46	**Which is the valid dictionary declaration?** i) d1={1:'January',2='February',3:'March'} ii) d2=(1:'January',2:'February',3:'March'} iii) d3={1:'January',2:'February',3:'March'} iv) d4={1:January,2:February,3:March}
Ans.	**(iii)**
47	**What is/are not true about Python's Dictionary?** (i) Dictionaries are mutable (ii) Dictionary items can be accessed by their index position (iii) No two keys of dictionary can be same (iv) Dictionary keys must be of String data type
Ans.	**(ii) and (iv)**

48	x="abAbcAba"
	for w in x:
	  if w=="a":
	  print("*")
	  else:
	  print(w)

Ans.	* b A b c A b *
49	**Convert the following 'for' loop using 'while' loop** for k in range (10,20,5): print(k)

Ans.	**k = 10**
	while k<=20:
	  print(k)
	  k+=5

50	**Give Output** colors=["violet", "indigo", "blue", "green", "yellow", "orange", "red"] del colors[4]

	colors.remove("blue") p=colors.pop(3) print(p, colors)
Ans.	**orange ['violet', 'indigo', 'green', 'red']**

51	**Output of following code:**
	A=10
	B=15
	S=0
	while A<=B:
	  S = A + B
	  A = A + 10
	  B = B + 10
	  if A>=40:
	  A = A + 100
	print(S)

Ans.	**65**

52	**Output of the following code:**
	X = 17
	if X>=17:
	  X+=10
	else:
	  X-=10
	print(X)

Ans.	**27**
53	**How many times loop will execute:** P=5 Q=35 while P<=Q: P+=6
Ans.	**6 times**

54	**Find and write the output of the following python code:**
	Msg="CompuTer"
	Msg1=''
	for i in range(0, len(Msg)):
	  if Msg[i].isupper():
	  Msg1=Msg1+Msg[i].lower()
	elif i%2==0:
	  Msg1=Msg1+'*'
	  else:
	  Msg1=Msg1+Msg[i].upper()
	print(Msg1)

Ans.	**cO*P*t*R**
55	A=10 B=10 print(A == B) = ? print(id(A) == id(B) = ? print(A is B) = ?
Ans.	True True True

1. Explain any three merits and three demerits of Python.
2. Give full form of Python's IDLE.
3. What do you mean by identifiers? Give any four rules to define an identifier.

What do you mean by comments? How will you add inline, single line or multiline comments in Python?

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5. What do you mean by lvalue and rvalue? Give an example.
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8. Compare strings, lists and tuples.
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11. Write a program to calculate and print the roots of quadratic equation $\mathbf{ax^2+bx+c=0}$. The program should display suitable message whether roots are real, equal, different or imaginary.
12. Write a program to calculate electricity charges based on number of consumed electricity units as per following conditions:

Units	Charges
Upto 100	Rs. 2 per unit
101 - 200	Rs. 200 + Rs. 3.5 per unit for units exceeding 100
201 - 300	Rs. 550 + Rs. 7.5 per unit for units exceeding 200
301 & above	Rs. 1300 + Rs. 9 per unit for units exceeding 300

13. Write a program to calculate BMI of a person after inputting its weight in kgs and height in meters and then print the nutritional status as per following table :

14. Nutritional Status	15. WHO criteria BMI cut-off
16. Underweight	17. less than 18.5
18. Normal	19. 18.5 to 24.9
20. Overweight	21. 25 – 29.9
22. Obese	23. 30 or above

Formula to calculate **BMI = weight in Kgms./ (height in meter)^2**

14. Rewrite the following code fragment using while loop:

```
min = 0
max= num
if num < 0 :
    min = num
    max = 0
    for i  in range(min, max +1):
        sum +=i
```

15. Predict the output of the following code if value of a is entered as 5:

```
a = int( input("Enter break code ")) # line first
num = 10
while num> 0:
    sum += num
    num -= 2
    if num < a :
        break;
else :
    sum+= num
print( sum)
```

16. Write a program in Python with the help of loops to find out the substrings of a given string.

For eg, input of 'Cat' should display:

C Ca Cat a at t

AUTUMN BREAK HOME WORK

SUBJECT: MATHS

CLASS: XI

1 / 2 Marks Questions

1	If $A \times B = \{(a, 1), (b, 3), (a, 3), (b, 1), (a, 2), (b, 2)\}$, find A and B.
2	Find the multiplicative inverse of $\frac{1}{4-3i}$.
3	Solve $30x < 200$ when x is an integer.
4	Write domain of function $f(x)=\frac{x^2-2x+3}{x^2-x-20}$.
5	If $n_{C_2} - n_{C_1} = 35$, find value of n.
6	What is the value of $\sin\left(\frac{31\pi}{3}\right)$.
7	Write power set of {0, 1, 2}.
8	Write the number of subsets for an Empty set.
9	How many words with or without meaning can be formed using all the letters of the word "GOOGLE".
10	What is domain of $f(x)=\frac{1}{3x-2}$
11	Find the value of $\tan\frac{19\pi}{3}$
12	Find r, if ${}^5P_r = 2 . {}^6P_{r-1}$
13	Find value of $\tan\frac{\pi}{8}$.
14	Let f = {(1, 1), (2, 3), (0, −1)}(-13)} be a linear function from z into z, find f(x).
15	In how many ways can the letters of word "PERMUTATIONS" be arranged if the (i) vowels are all together

3 / 5 Marks Questions

16	Find the domain and range of the real function $f(x) = \sqrt{4 - x^2}$.
17	Let $A = \{1, 2, 3, 4, \ldots 14\}$. Define a relation R from A to A by $R = \{(x, y): 3x - y = 0$, where $x, y \in A\}$. Write (i) R *in roster form* (ii) Domain (iii) Co-domain (iv) Range
18	Show that $tan3x\ tan2x\ tanx = tan3x - tan2x - tanx.$
19	Prove that $(cosx + cosy)^2 + (sinx - siny)^2 = 4cos^2\ \frac{x+y}{2}$.
20	Show that $A \cup B = A \cap B$ implies A=B
21	What is the real value of x and y if $((x - iy)(3 + 5i)$ is the conjugate of -6-24i.
22	Prove that $\frac{sinx - sin3x}{sin^2x - cos^2x} = 2\sin x$
23	Solve the system of inequalities graphically $x - 2y \leq 3$, $3x + 4y \geq 12$, $x \geq 0$, $y \geq 1$
24	(i) How many words with or without meaning can be formed with letters of the word EQUATION at a time so that the vowels and consonants occur together? (ii) If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$, find x.

25	How many numbers greater than 1000000 can be formed by using 1,2,0,2,4,2,4.
26	Prove that : $\cos 2x \cos\frac{x}{2} - \cos 3x \cos\frac{9x}{2} = \sin 5x \text{ or } \sin\frac{5x}{2}$.
27	In a survey of 500 television viewers produced the following information, 285 watch football, 195 watch hockey, 115 watch basketball, 45 watch football and basketball, 70 watch football and hockey, 50 watch hockey and basketball 50 do not watch any of three games. How many watch all three games ? How many watch exactly one of three games?
28	(i) How many different words can be formed with the letters of word "Haryana" ? (ii) How many of these begin with H and end with N. (iii) In how many of these H and N are together.
29	Find the graphically solution of $x + 2y \leq 10,\ x + y \geq 1,\ x - y \leq 0,\ x \geq 0,\ y \geq 0$
30	Prove that $\sin^3 x + \sin^3\left(\frac{2\pi}{3} + x\right) + \sin^3\left(\frac{4\pi}{3} + x\right) = -\frac{3}{4}\sin 3x$

OBJECTIVE

To verify that the relation R in the set of lines in a plane, defined by $R = \{(l, m) : (l \perp m\}$ is symmetric but neither reflexive nor transitive.

PRE-REQUISITE KNOWLEDGE

- Concept of parallel lines, perpendicular lines and inclined lines in a plane.
- Concept of relations *i.e.,* a relation R from $A \to B$ is a sub set of $A \times B$, we write it as $R = \{(a, b) : a \in A$ $b \in B$ and $a\ R\ b\}$.
- **Concept of reflexive relation:** A relation R in non-empty set A is said to be reflexive if $a\ R\ a$ for every $a \in A$, *i.e.,* $(a, a) \in R$ for all $a \in A$.
- **Concept of symmetric relation:** A relation in a non-empty set A is symmetric if $a\ R\ b \Rightarrow b\ R$ *i.e.,* $(a, b) \in R \Rightarrow (b, a) \in R, \forall\ a, b \in A$.
- **Concept of transitive relation:** A relation in a set A is said to be transitive if $a\ R\ b, b\ R\ c \Rightarrow a\ R$ *i.e.,* $(a, b) \in R; (b, c) \in R \Rightarrow (a, c) \in R$ for every $a, b, c \in A$.

MATERIALS REQUIRED

- Card board
- White sheet of paper
- Geometry box
- Board pins
- Coloured pincils or pens
- Eraser
- Cutter

PROCEDURE

- Take a card board and fix a white sheet on it with the help of board pins.

- Using different coloured pincils, draw lines on white sheet in such a way that some of them are parallel, some are perpendicular to each other and some are inclined lines.
- Name the lines as $l_1, l_2, l_3, ..., l_{10}$ as shown in Fig. 1.1.

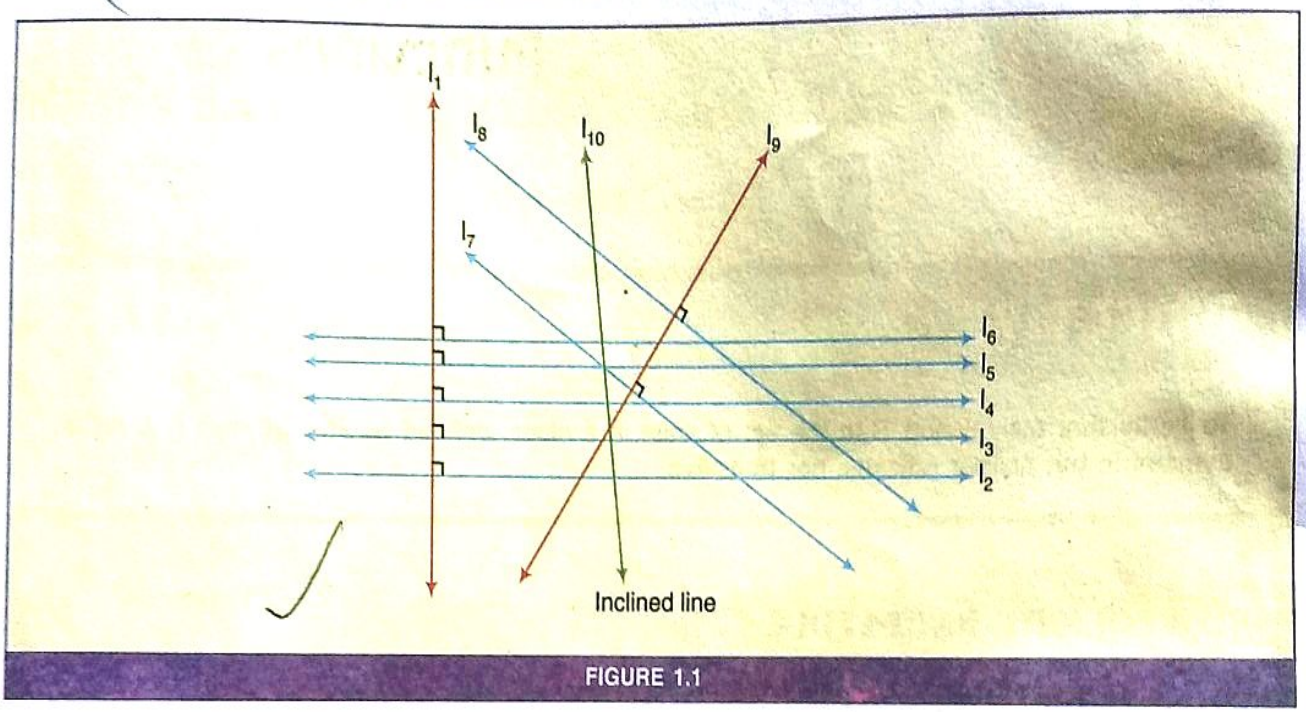

FIGURE 1.1

DEMONSTRATION

- In Fig. 1.1, l_1 is perpendicular to l_2, l_3, l_4, l_5, l_6. Where l_2, l_3, l_4, l_5 and l_6 are parallel lines.
- l_7 and l_8 are parallel lines.
- l_7 is perpendicular to l_9 and l_8 also is perpendicular to l_9.
- l_{10} is inclined line (which is neither parallel nor perpendicular to any line).
- l_2 is parallel to l_3, l_4, l_5 and l_6 *i.e.*, $l_2 \parallel l_3, l_3 \parallel l_4, l_4 \parallel l_5, l_5 \parallel l_6, l_3 \parallel l_4$ etc.

Thus $(l_1, l_2), (l_1, l_3), (l_1, l_4), (l_1, l_5), (l_1, l_6), (l_7, l_9), (l_8, l_9)$ are perpendicular lines.

So, $(l_1, l_2), (l_1, l_3), (l_1, l_4), (l_1, l_5), (l_1, l_6), (l_7, l_9), (l_8, l_9) \in R$. (Lines are perpendicular to each other).

OBSERVATIONS

For Reflexive

In Fig. 1.1, we observe that **no line** is perpendicular to itself.

So the relation $R = \{(l, m) : l \perp m\}$ is **not reflexive.**

For Symmetric

Now, l_1 is perpendicular to l_2 (yes)

Hence l_2 is perpendicular to l_1 (yes)

$\Rightarrow$ $l_1 \perp l_2 \Rightarrow l_2 \perp l_1$

$\therefore$ $(l_1, l_2) \in R \Rightarrow (l_2, l_1) \in R$

Similarly, l_1 is perpendicular to l_3 hence l_3 is perpendicular to l_1

$\Rightarrow$ $(l_1, l_3) \in R \Rightarrow (l_3, l_1) \in R$

Again, l_1 is perpendicular to l_4 hence l_4 is perpendicular to l_1

$\Rightarrow$ $(l_1, l_4) \in R \Rightarrow (l_4, l_1) \in R$

This can be easily observe for line

(l_1, l_5), (l_1, l_6), (l_7, l_9), (l_8, l_9) that are perpendicular to each other.

Thus, using the concept of symmetry, we have

$R = \{(l, m) : l \perp m\}$ is **symmetric.**

For Transitivity

We know, relation R is said to be transitive if

$(a, b) \in R; (b, c) \in R \Rightarrow (a, c) \in R$ for all $a, b, c \in A$

but here from Fig. 1.1, we observe that

$l_2 \perp l_1$, $l_1 \perp l_3$ but l_2 is not perpendicular to l_3 *i.e.*, $(l_2, l_1) \in R$, $(l_1; l_3) \in R$ but $(l_2, l_3) \notin R$.

So, the relation R = {(l, m) : $l \perp m$} is **not transitive.**

RESULT

$R = \{(l, m) : l \perp m\}$ is **neither reflexive, nor transitive** but **it is symmetric.**

APPLICATION

This activity can be used to check, whether the give relation is reflexive, symmetric, transitive then equivelance relation or not.

VIVA-VOCE

1. When does a relation R in set A is called reflexive?

Ans. If $(a, a) \in R$, for every $a \in A$ is called reflexive relation.

2. When does a relation R in set A is called symmetric?

Ans. If $(a, b) \in R \Rightarrow (b, a) \in R$ for every $a, b \in A$, then relation is called symmetric.

3. When does a relation R in set A is called transitive relation?

Ans. If $(a, b) \in R$, $(b, c) \in R \Rightarrow (a, c) \in R$ for every $a, b, c \in A$, then relation is called transitive.

4. If $R = \{(T_1, T_2) : T_1$ and T_2 are congruent triangles$\}$, does R is reflexive?

Ans. Yes, R is reflexive because each triangles is congurent to itself.

5. Let $R = \{(a, b) : a, b \in A\}$ where $A = \{1, 2, 3, 4\}$ if R is reflexive, write R in tabular form.

Ans. $R = \{(1, 1), (2, 2), (3, 3), (4, 4)\}$.

OBJECTIVE

To verify whether the relation R in the set of all lines in a plane, defined by $R = \{(l, m) : l \parallel m\}$ is an equivalence relation or not.

PRE-REQUISITE KNOWLEDGE

- Concept of parallel lines.
- Concept of relation.
- Concept of relations, like—reflexive, symmetric and transitive.
- Concept of equivalence relation, *i.e.,* if a relation is reflexive, symmetric and transitive then it is said to be an equivalence relation.

MATERIALS REQUIRED

- Card board
- White sheet of paper
- Geometry box
- Board pins
- Coloured pencils or pens
- Eraser
- Cutter

PROCEDURE

- Take a card board and fix a white sheet of paper on it with the help of board pins.
- Using scale and different coloured pencils draw lines on the sheet in such a way that some of them are parallel, some are perpendicular and some are inclined lines as shown in Fig. 2.1.

- Name the lines as $l_1, l_2, l_3, ..., l_{10}$ as shown in Fig. 2.1.

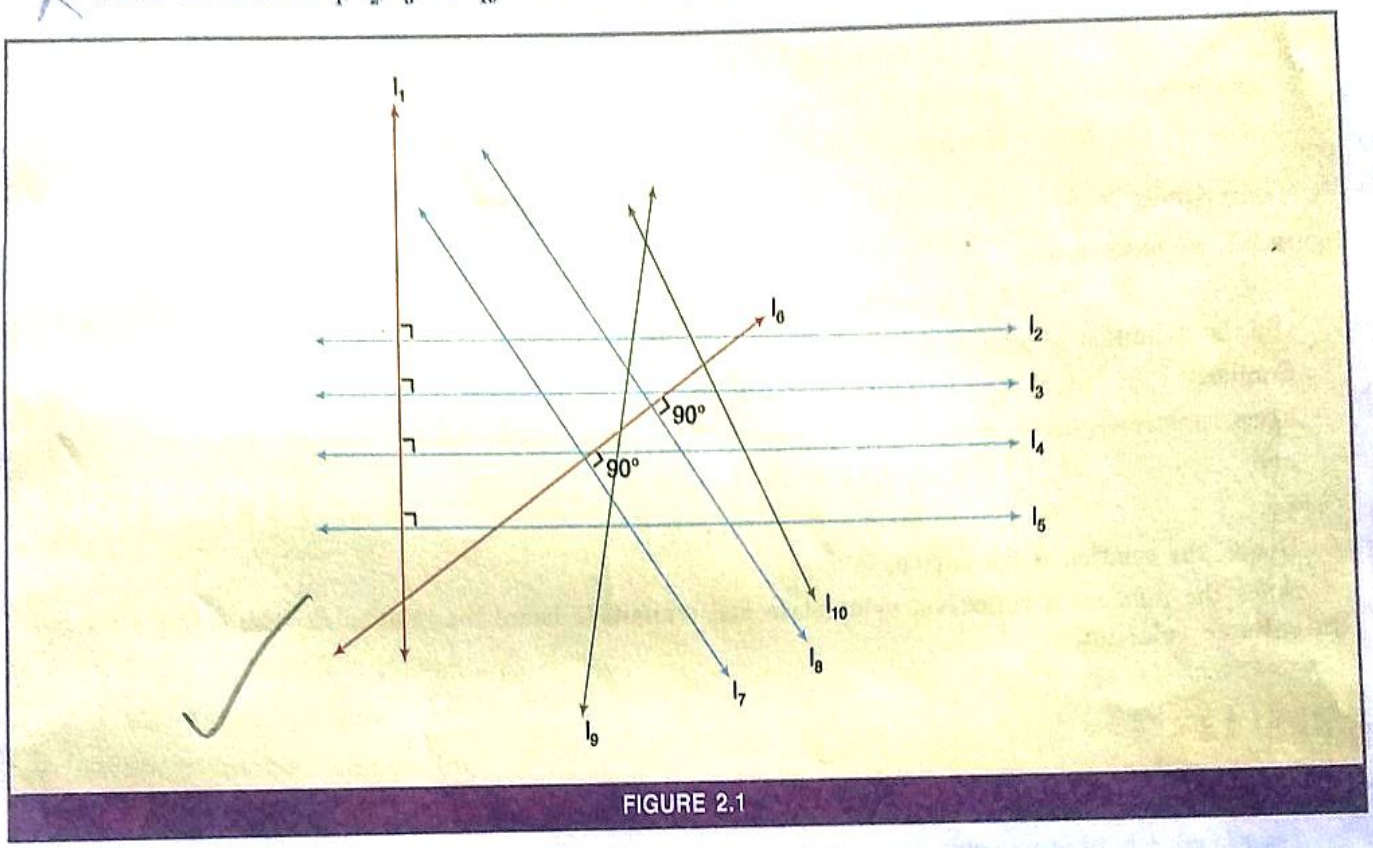

FIGURE 2.1

DEMONSTRATION

- In Fig. 2.1, lines $l_1 \perp l_2$, $l_1 \perp l_3$, $l_1 \perp l_4$, $l_1 \perp l_5$, $l_6 \perp l_8$, $l_6 \perp l_7$
- l_2 is parallel to l_3, l_4, l_5 and l_7 is parallel to l_8.
- l_9 and l_{10} are inclined lines.

Thus the required relation is represented by (l_2, l_3), (l_2, l_4), (l_2, l_5), (l_3, l_4), (l_3, l_5), (l_4, l_5), (l_7, l_8)

So $\{(l_2, l_3), (l_2, l_4), (l_2, l_5), (l_3, l_4), (3, 5), (l_4, l_5), (l_2, l_5)\ (l_7, l_8)\} \in R$.

$\therefore R = \{(l, m) : l \text{ is parallel to } m\}$

Now we have to check the relation R of all parallel lines in the plane.

OBSERVATIONS

For Reflexive

In Fig. 2.1, we observe that every **line is parallel to itself**. So the relation $R = \{(l, m) : l \parallel m\}$ is **reflexive** *i.e.*, l_1 is parallel to l_1, l_2 is parallel to l_2 ... etc.

Hence, $R = \{(l, m) : l \parallel m\}$, so the relation is **reflexive.**

For Symmetric

$$R = \{(l, m) : l \parallel m\}, \forall\ l, m \in R.$$

We observe that

$l_2 \parallel l_3$. Clearly, $l_3 \parallel l_2$

$$l_3 \parallel l_4 \Rightarrow l_4 \parallel l_3$$
$$l_4 \parallel l_5 \Rightarrow l_5 \parallel l_4$$
$$l_7 \parallel l_8 \Rightarrow l_8 \parallel l_7$$

Since for each l, m, $(l, m) \in R \Rightarrow (m, l) \in R$

$\therefore$ The relation R is **symmetric.**

For Transistivity

Figure 2.1, we observe

$$l_2 \parallel l_3 \text{ and } l_3 \parallel l_4 \Rightarrow l_2 \parallel l_4$$

(By the definition of parallel lines)

Similarly, $l_3 \parallel l_4$ and $l_4 \parallel l_5 \Rightarrow l_3 \parallel l_5$

Thus, $(l_2, l_3) \in R, (l_3, l_4) \in R \Rightarrow (l_2, l_4) \in R$

and $(l_3, l_4) \in R, (l_4, l_5) \in R \Rightarrow (l_3, l_5) \in R$

i.e., $(a, b) \in R, (b, c) \in R \Rightarrow (a, c) \in R$

Hence, the relation is **transitive.**

Since the relation is **reflexive, symmetric** and **transitive** hence the relation $R = \{(l, m) : l \parallel m\}$ is an **equivalence relation.**

RESULT

The set of all lines in the plane which are parallel to each other defined as

$R = \{(l, m): l \parallel m\}$ is an equivalence relation.

APPLICATION

This activity is useful in understanding the concept of equivalence relation.

VIVA-VOCE

1. What do you mean by an empty relation?

Ans. A relation R in a set A is called an empty relation, if no element of A is related to any element of A *i.e.*, $R = \phi \subset A \times A$.

2. If a relation is reflexive, symmetric and transitive, then it is known as:

Ans. An equivalence relation.

3. Which methods are used to represent relation?

Ans. There are two methods:

(*i*) Roster method (*ii*) Set builder method

4. If R_1 and R_2 are two equivalence relation in set A, then $R_1 \cap R_2$ is equivalence or not.

Ans. Yes $R_1 \cap R_2$ will be an equivalence relation, because both are reflexive, symmetric and transitive therefore their intersection will be reflexive, symmetric and transitive *i.e.*, equivalence.

5. If $A = \{1, 2\}$, $B = \{a, b\}$, then what is $B \times A$?

Ans. $B \times A = \{(a, 1) (a, 2) (b, 1) (b, 2)\}$.

OBJECTIVE

To verify the types of functions

(*i*) One-One function (Injection)

(*ii*) Many one function

(*iii*) Onto function (Surjection)

(*iv*) Into function

(*v*) Bijection (one-one, onto-function)

PRE-REQUISITE KNOWLEDGE

- **Function:** Let X and Y be two non-empty sets. Then a rule which associates to each element $x \in X$, a unique element denoted by $f(x)$ of Y is called a function and written as $f : X \to Y$.
- **One-one function (Injective function):** A function $f : X \to Y$ is defined as one-one if the image of distinct element of X under rule f are distinct.

  i.e., Let $x_1, x_2 \in X$, such that $f(x_1) = f(x_2) \Rightarrow x_1 = x_2$.
- **Many one function:** A function $f : X \to Y$ is said to be many one function if two or more elements of X are associated with the same element of Y *i.e.,* $x_1, x_2 \in X$ such that $x_1 \neq x_2$ but $f(x_1) = f(x_2)$.
- **Onto function (Surjective function):** A function $f : X \to Y$ is said to be onto function, if each element of Y is the image of some element of X *i.e.,* for every $y \in Y$ there exists some $x \in X$.
- **Into function:** If $f : X \to Y$ is not on to function then f is called an into function.
- **One-one and onto function (Bijective function):** A function $f : X \to Y$ is said to be one-one onto, if the function is both one-one and onto. It is also known as bijective function.

MATERIALS REQUIRED

- Card board
- White sheet of paper
- Pencil box
- Strips of papers of different colour
- Adhesive
- Board pins

PROCEDURE

- Take a card board and fix a white sheet of paper with the help of board pins on card board.
- Paste five pair of paper strips on the left side of card board.
- On first pair, write 1, 2, 3 on left side strip and a, b, c, d on right side strip as shown in Fig. 3.1.
- On second pair, write 1, 2, 3 on left side strip and a, b, c, d on right side strip (Fig. 3.2).
- On third pair write 1, 2, 3 on left side strip and a, b, c on right side strip (Fig. 3.3).
- On fourth pair write 1, 2, 3 on left side strip and a, b on right side strip (Fig. 3.4).
- On fifth pair write 1, 2, 3 on left side strip and a, b, c, d on right side strip (Fig. 3.5).

Now join them by arrow as shown in figures 3.1 to 3.5.

DEMONSTRATION

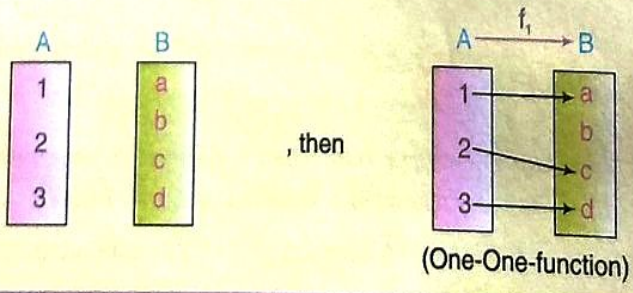

FIGURE 3.1

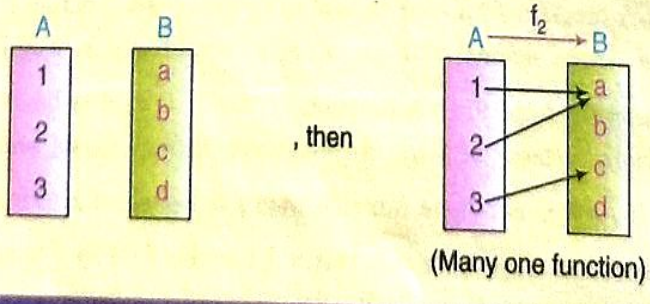

FIGURE 3.2

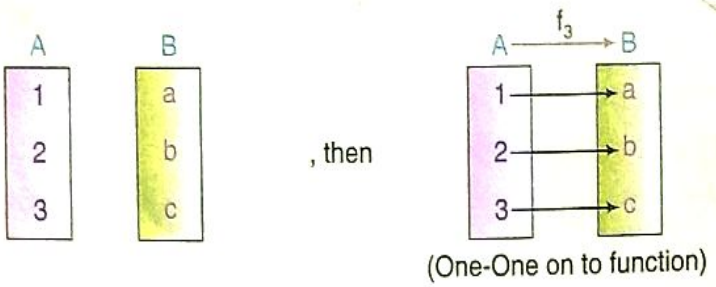

FIGURE 3.3

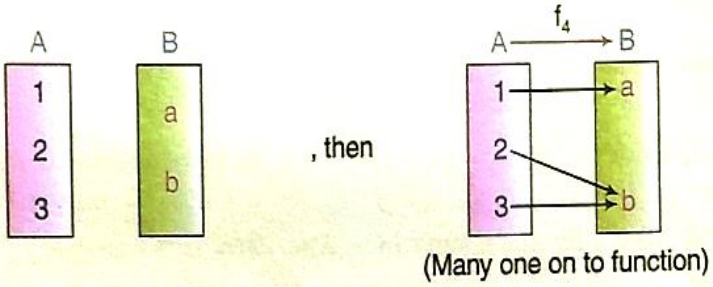

FIGURE 3.4

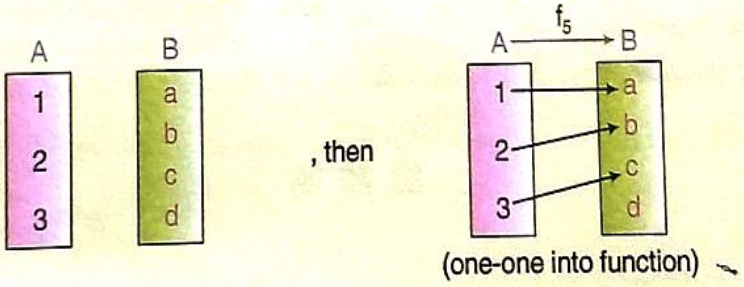

FIGURE 3.5

OBSERVATIONS

- $f_1 : A \to B$; it is one-one function because image of distinct elements of A under f_1 are distinct.
- $f_2 : A \to B$ is many one into function because 1, 2 of A are associated with a of B and b, $d \in B$, but there is no element of A whose image under f_2 are b and d (Fig. 3.2).
- $f_3 : A \to B$ is one-one and onto function because each element of B is the image of some element of A (Fig. 3.3).
- $f_4 : A \to B$ is many-one onto function because all the elements of B are the image of some elements of A under f_4 (Fig. 3.4).
- $f_5 : A \to B$ is one-one into function because the element $d \in B$ and there is no element of A, whose image under f_5 is d (Fig. 3.5).

From above observations, we find that $f_3 : A \to B$ is **one-one** and **onto function.** So it is **bijective function**

RESULT

(*i*) If $f : A \to B$ is **one-one** then it is **injective.**

(*ii*) If $f : A \to B$ is **on-to** then it is **surjective.**

(*iii*) If $f : A \to B$ is such that it is **one-one** and **onto** then it is called **bijective.**

APPLICATION

To understand the concepts of one-one, many one, onto, into, injective, surjective and bijective functions.

VIVA-VOCE

1. What is one-one function?

Ans. A function $f: X \to Y$ is said to be one-one if different elements of X have different images in Y.

2. Is {(2, 3), (2, 4), (3, 5)} a function?

Ans. No, it is not a function since 2 has two images 3 and 4.

3. What is bijective function?

Ans. A function is said to be bijective if it is one-one and on to.

4. Is the function $f : N \to N$, defined by $f(x) = 4 - 3x$ is one-one?

Ans. Yes, it is one-one.

5. Is {(1, 3); (2, 6); (3, 9); (4, 12)} a function?

Ans. Yes, it is one-one function.

6. What do you mean by many one function?

Ans. When two or more elements of first set are related to one element of second set then the function is called many one function.

OBJECTIVE

To demonstrate a function

(*i*) which is not one-one but on-to.

(*ii*) one-one but not on-to.

PRE-REQUISITE KNOWLEDGE

- Function
- Type of functions, like one-one function, many one function, one-one on to function; one-one but not on-to; not one-one but on-to.
- Domain and range of a function.

MATERIALS REQUIRED

- Card board
- White sheets of paper
- Coloured pen or pencils
- Strips of papers of different colour
- Adhesive
- Board pins

PROCEDURE

- Take a card board and fix a white sheet of paper on it using board pins or adhesive.
- Paste four pair of paper strips on the left side of card board and name them as A and B.

+ − X + =

- Use first two pair of strips to demonstrate the function is not one-one but it is onto as shown in Fig. 4.1 and Fig. 4.2
- Use next two pair of strips to demonstrate the function is one-one but not on-to as shown in Fig. 4.3 and Fig. 4.4.
- On first pair write 1, 2, 3 on left side strip and a, b on right side strip as shown in Fig. 4.1.
- On second pair write 1, 2, 3, 4, 5 on left side strip and a, b on right side strip as shown in Fig. 4.2.
- On third pair write 1, 2, 3 on left strip and a, b, c, d on right side strip as shown in Fig. 4.3.
- On fourth pair write 1, 2 on left strip and a, b, c, d on right side strip as shown in Fig. 4.4.

DEMONSTRATION

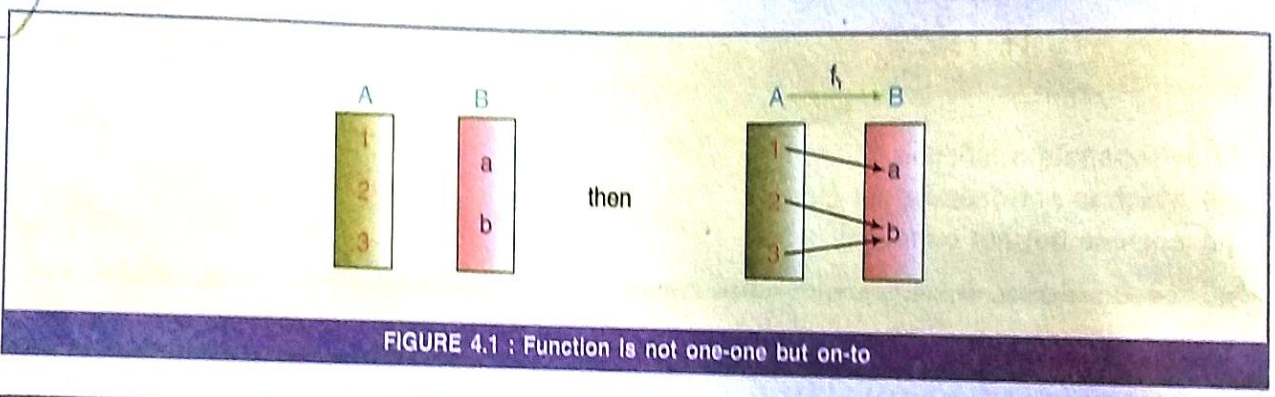

FIGURE 4.1 : Function is not one-one but on-to

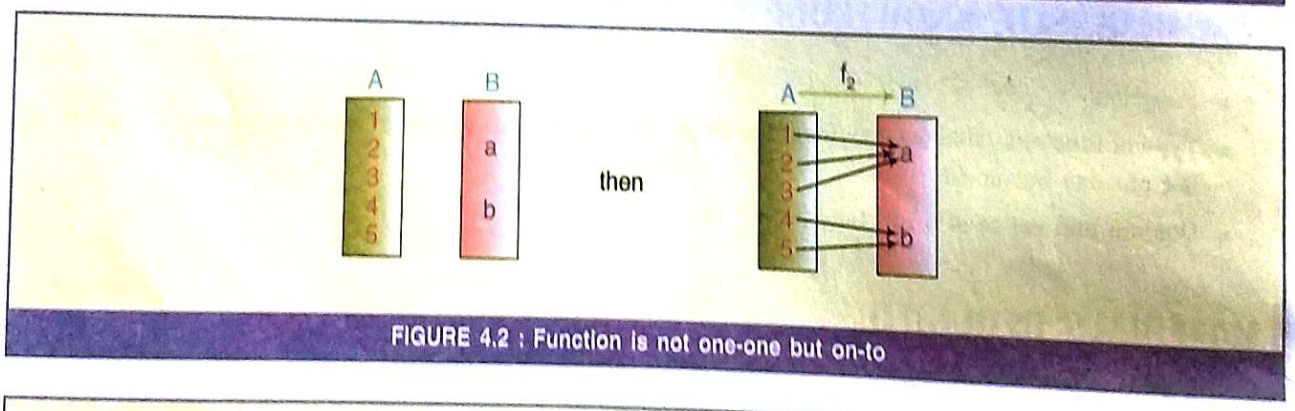

FIGURE 4.2 : Function is not one-one but on-to

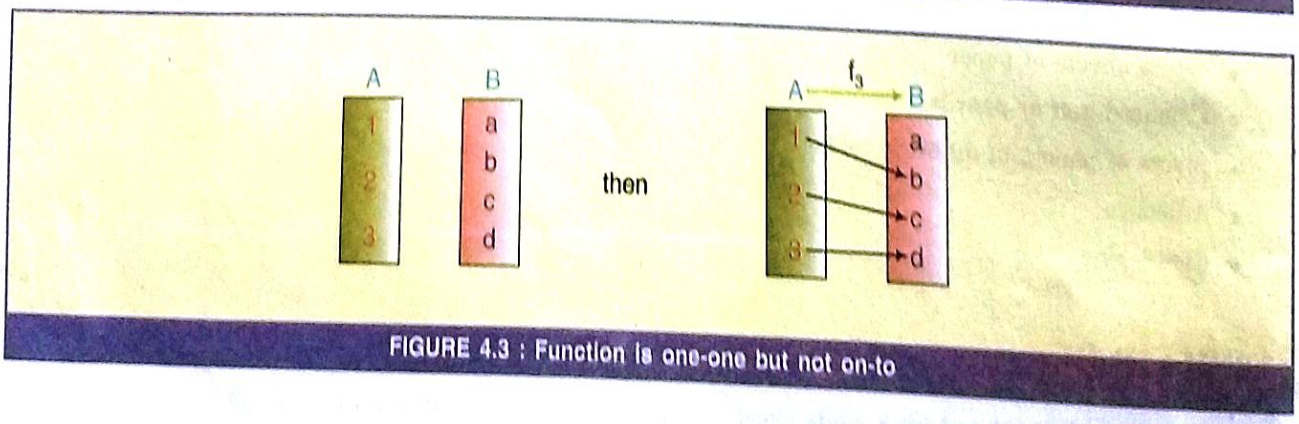

FIGURE 4.3 : Function is one-one but not on-to

FIGURE 4.4 : Function is one-one but not on-to

OBSERVATIONS

- In Fig. 4.1, $f_1 : A \to B$ is not one-one but it is on to because the image of element 1 of A in B is a and image of 2 and 3 of A in B is b, *i.e.*, two elements have same image, hence f_1 is not one-one but it is on-to as there is no element left in B without its pre-image. Hence **$f_1 : A \to B$ is not one-one but on-to.**
- In Fig. 4.2, $f_2 : A \to B$ is not one-one but it is on to because the image of element 1, 2, 3 of A in B is a and 4, 5 of A in B is b, *i.e.*, different elements of A have same image in B. As there is no element left in B without its pre-image. Hence **$f_2 : A \to B$ is not one-one but on-to.**
- In Fig. 4.3, $f_3 : A \to B$ is one-one but not on to because element 1, 2, 3 of A have b, c, d respectively the image in B but a of B is not associated with any element of A. So **$f_3 : A \to B$ is one-one but not on-to.**
- In Fig. 4.4, $f_4 : A \to B$ is one-one but not on to because element 1 of A has image a in B and element 2 of A has image d in B but b, c of B are not mapped with any element. So **$f_4 : A \to B$ is one-one but not on-to.**

RESULT

Here, $f_1 : A \to B$ is not **one-one** but **on-to.**

$f_2 : A \to B$ is not **one-one** but **on-to.**

$f_3 : A \to B$ is **one-one** but not **on-to.**

$f_4 : A \to B$ is **one-one** but not **on-to.**

APPLICATION

This activity is useful to understand the concepts

(*i*) not one-one but on-to.

(*ii*) one-one but not on-to.

(5)

OBJECTIVE

To find analytically the LHL and RHL of a function at a given point and to check whether the function is continuous or not.

PRE-REQUISITE KNOWLEDGE

- Concept of LHL (Left hand limit) of a given function at the given point.
- Concept of RHL (Right hand limit) of a given function at the given point.
- Concept of continuity of a function at a point.

  i.e., $\lim_{x \to c^-} f(x) = \lim_{x \to c^+} f(x) = f(c)$

MATERIALS REQUIRED

- Card board
- Coloured pen or pencils
- White sheet of paper
- Calculator

PROCEDURE

- Let the given function be $f(x) = \begin{cases} \dfrac{x^2 - 25}{x - 5}, & x \neq 5 \\ 12, & x = 5 \end{cases}$
- Here we have to check the continuity of the given above function at $x = 5$.
- Put some values of x, in the function which are very-very close to $x = 5$ and they are in the left of 5. (Use calculator to find these values).

- Put some values of x in the function which are very-very close to $x = 5$ and they are in the right of $x = 5$ (Use calculator to find these values).
- Record these values in the form of table as below.

DEMONSTRATION

- The values of x and $f(x)$ when x is very-very close to $x = 5$ in left side of $x = 5$. **(Table I)**

x	4.9	4.99	4.999	4.9999	4.99999	4.999999
$f(x)$	9.9	9.99	9.999	9.9999	9.99999	9.999999

- The values of x and $f(x)$ when x is very-very close to $x = 5$ in right side of $x = 5$. **(Table II)**

x	5.1	5.01	5.001	5.0001	5.00001	5.000001	5.0000001
$f(x)$	10.1	10.01	10.001	10.0001	10.00001	10.000001	10.0000001

OBSERVATIONS

1. The value of $f(x) = \dfrac{x^2-25}{x-5}$ approaches to 10 as the value of x approaches to 5 from the left.
2. The value of $f(x) = \dfrac{x^2-25}{x-5}$ approaches to 10 as the value of x approaches to 5 from the right.
3. Therefore, $\lim\limits_{x\to 5^-} f(x) = 10$ and $\lim\limits_{x\to 5^+} f(x) = 10$

   i.e., LHL at $x = 5$ of the function is 10.

   and RHL at $x = 5$ of the function is 10.
4. Thus, $\lim\limits_{x\to 5^-} f(x) = \lim\limits_{x\to 5^+} f(x) = 10$

   But it is given that $f(x)$ at $x = 5$ is 12.

   So, $\lim\limits_{x\to 5^-} f(x) = \lim\limits_{x\to 5^+} f(x) \neq f(5)$

   i.e., $10 = 10 \neq 12$

   Thus **Left hand limit of $f(x) = 10$**

   Right hand limit of $f(x) = 10$

   as the value of $f(x)$ at $x = 5$ is 12 (given)

   hence $f(x)$ is not continuous at $x = 5$.

   i.e., **$f(x)$ is discontinuous at $x = 5$.**

RESULT

If $\lim\limits_{x\to c^-} f(x) = \lim\limits_{x\to c^+} f(x) = f(c)$, then $f(x)$ is said to be continuous at $x = c$ otherwise it is discontinuous.

6

OBJECTIVE

To understand the concepts of local maxima, local minima and point of inflection.

PRE-REQUISITE KNOWLEDGE

- Concept of local maxima.
- Concept of local minima.
- Concept of point of inflection.

Using first order derivative test, we have

(*i*) If the sign of the slope of tangent (first derivative of function) at a point on the curve *i.e.*, if $f'(x)$ changes sign from positive to negative as x increase, through C then C is the point of **local maxima.**

Mean, $f'(x) > 0$ at every point sufficiently close and to the left of C

and $f'(x) < 0$ at every point sufficiently close and to the right of C.

(*ii*) If the sign of the slope of tangent (first derivative of the function) at point C on the curve *i.e.*, $f'(x)$ changes sign from negative to positive as x increases through C then C is the point of **local minima.**

Mean $f'(x) < 0$ at every point sufficiently close to the left of C.

$f'(x) > 0$ at every point sufficiently close to the right of C.

(*iii*) If $f'(x)$ *i.e.*, slope of tangent to the curve does not change its sign as x increases through C, the C is neither a point of local maxima nor a point of local minima. Such point is called point of **inflection.**

MATERIALS REQUIRED

- Card board
- Pieces of wire
- White sheet of paper

- Coloured pens or pencils
- Sketch pen
- Scale
- Cutter
- Eraser
- Gum stick

PROCEDURE

- Take a piece of card board of any convenient size and fix a white sheet paper on it with the help of board pins.
- Draw two perpendicular lines in the middle of the paper with scale and pencil in the form x-axis and y-axis.
- Take a wire of sufficient length and bend it in the shape of curve as shown in figure 13.1 and along the wire draw curve with coloured pencil or pen or sketch pen.
- Take some other pieces of wire and put them as tangents on the curve at the turning points or critical points of the curve, along the wire draw straight lines with coloured pen or pencil and remove the wires.

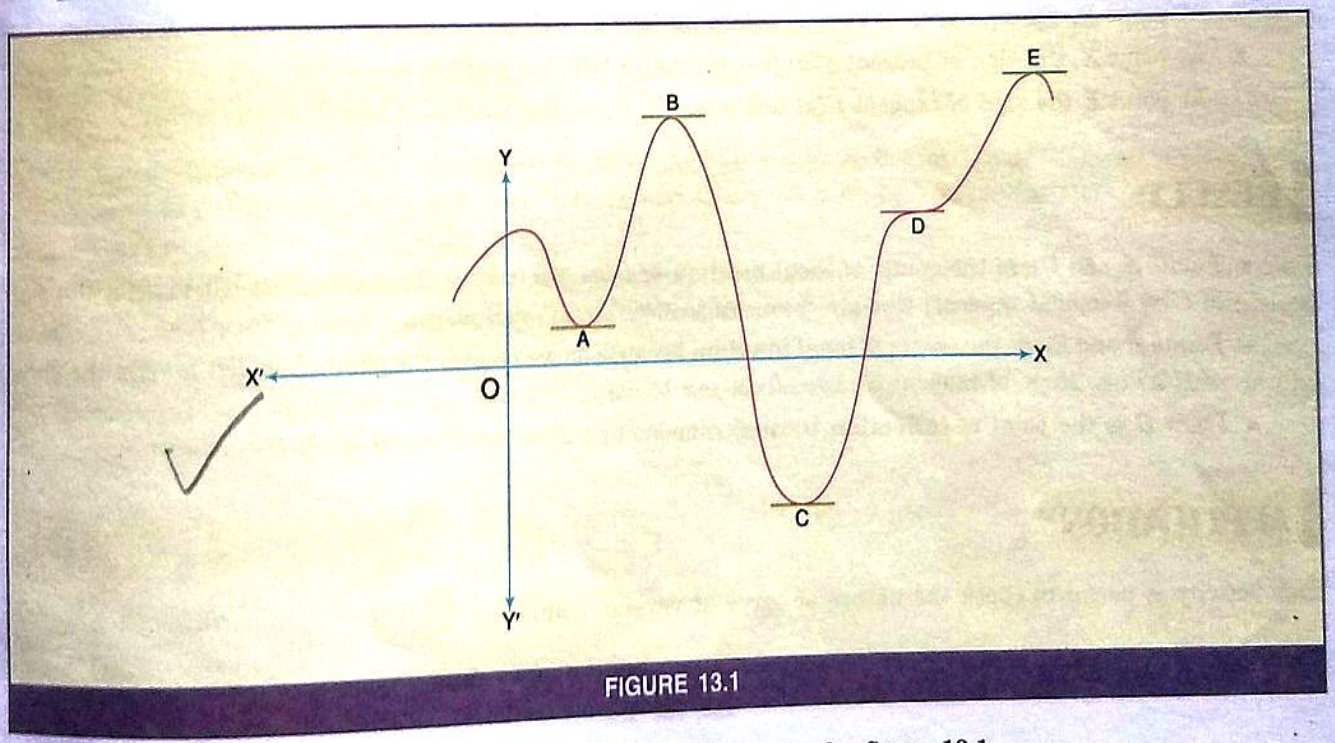

FIGURE 13.1

- Mark the points on the curve as A, B, C, D, E as shown in the figure 13.1.

DEMONSTRATION

- Here the straight lines at point A, B, C and E representing the tangents to the curve and parallel to x-axis.

- Slope of tangents at points A, B, C, and E are zero mean $f'(x) = 0$ at these points.
- The tangent at point D intersects the curve.
- At points A and C, sign of tangent (first derivative) changes from negative to positive as we crosses point A and C from left to right. So the points A and C are the points of **local minima.**
- At points B and E, sign of tangent (first derivative) changes from positive to negative as we crosses point B and E from left to right. So B and E are the points of **local maxima.**
- At point D, straight line crosses the curve hence first derivative does not change its sign so it is the point of **inflection.**

OBSERVATIONS

1. The sign of slope of the tangent at the point on the curve just left to A is –ve.
2. The sign of slope of the tangent at the point on the curve just right to A is +ve.
3. At point B, the sign of tangent $f'(x)$ just before (in left) the point B in +ve.
4. At point B, the sign of tangent *i.e.*, $f'(x)$ just after (in right) the point B is –ve.
5. At point C, the sign of tangent $f'(x)$ just before (in left) of point C is –ve.
6. At point C, the sign of tangent $f'(x)$ just after (in right) at point C is +ve.
7. At point D, the sign of tangent $f'(x)$ before (in left) as well as in right at point D does not change.
8. At point E, the sign of tangent $f'(x)$ just before (in left) the point E is +ve.
   At point E the sign of tangent $f'(x)$ just after (in right) the point E is –ve.

RESULT

- Points A and C are the points of **local minima** because we crosses the points from left to right the sign of $f'(x)$ [Slope of tangent] changes from –ve to +ve.
- Points B and E are the points of **local maxima** because as we crosses the points from left to right the value of $f'(x)$ *i.e.*, slope of tangent changes from +ve to –ve.
- Point D is the point of **inflection** because tangent line cuts the curve at point D.

APPLICATION

This activity is useful to check the nature of curve at various points.

OBJECTIVE

To understand the concept of absolute maximum and absolute minimum values of a function in the closed interval through its graph.

PRE-REQUISITE KNOWLEDGE

- **Local Maxima:** Let f be a real valued function and c be a point in the interior of f. Then c is called local maxima if there exists $h > 0$ such that $f(c) \geq f(x)$ for all $x \in (c - h, c + h)$. The value of $f(c)$ is local maximum value of f.
- **Local Minima:** Let f be a real valued function and c be the point in the interior of f. Then c is called local Minima if there exists $h > 0$ such that $f(c) \leq f(x)$ for all $x \in (c - h, c + h)$. The value of $f(c)$ is local minimum value of f.
- Absolute maxima, absolute minima and absolute maximum and minimum values in closed interval *i.e.*, highest and lowest values in the intire closed intervals.

MATERIALS REQUIRED

- Card board
- Graph paper
- Board pins
- Ruler
- Calculator
- Eraser
- Coloured pen or pencils
- Adhesive

+ − X ÷ =

PROCEDURE

- Take a card board and fix a graph paper of convenient size on it with the help of board pins or adhesive.
- Draw two perpendicular lines in the middle of paper as x-axis and y-axis as shown in Fig. 14.1.
- Mark the points on x-axis and y-axis.
- Let us take the function, $f(x) = (4x^2 - 9)(x^2 - 1)$ in the interval $[-2, 2]$.
- Calculate the values of $f(x)$, taking different suitable values of x (using calculator).
- Put the ordered pairs in the form of table as given below:

TABLE OF VALUES

x	0	± 0.5	± 1.0	± 1.25	± 1.27	± 1.5	± 2.0
$f(x)$	9	6	0	− 1.55	− 1.56	0	21

- We have to plot the ordered pairs on the graph paper and by a free hand, we obtained the graph of given function as below:

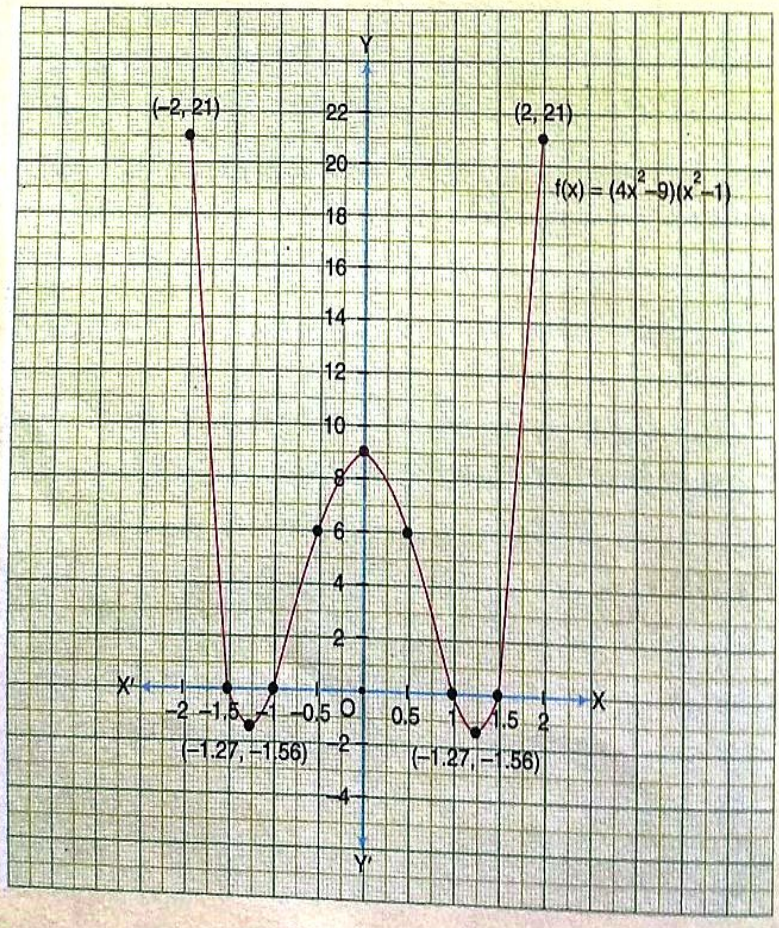

FIGURE 14.1

OBSERVATIONS

From graph we observe:

(*i*) The absolute maximum value of $f(x)$ is 21 at $x = \pm 2$

(*ii*) The absolute minimum value of $f(x)$ is -1.56 at $x = \pm 1.27$.

Verification from differentiation:

We have, $f(x) = (4x^2 - 9)(x^2 - 1)$

When $f(x) = 0$

$\Rightarrow (4x^2 - 9)(x^2 - 1) = 0$

$\Rightarrow$ Either $4x^2 - 9 = 0$ or $x^2 - 1 = 0$

$\Rightarrow x = \pm \frac{3}{2}$ or $x = \pm 1$

$x = \pm \frac{3}{2}$ and ± 1 both lies in $[-2, 2]$

Now, $f'(x) = (4x^2 - 9) \cdot 2x + 8x(x^2 - 1)$

$= 8x^3 + 8x^3 - 18x - 8x$

$= 16x^3 - 26x = 2x(8x^2 - 13)$

Put $f'(x) = 0$

$\Rightarrow 2x(8x^2 - 13) = 0$

$\Rightarrow$ Either $x = 0$ or $8x^2 - 13 = 0$

$\Rightarrow x = 0$ or $x = \pm \sqrt{\frac{13}{8}} = \pm 1.27$

$0; \pm 1.27 \in [-2, 2]$

The value of $f(x)$ at $x = \pm 2$ is 21 and value of $f(x)$ at $x = \pm 1.27$ is -1.56.

RESULT

The absolute maximum value of $f(x) = 21$ at $x = \pm 2$

and absolute minimum value of $f(x) = -1.56$ at $x = \pm 1.27$.

APPLICATION

Using this activity, we can find absolute maximum and minimum values of the given functions.

OBJECTIVE

To prove: cos $(A - B)$ = cos A cos B + sin A sin B using vectors.

PRE-REQUISITE KNOWLEDGE

- In unit circle *i.e.*, the circle of unit radius as shown below:

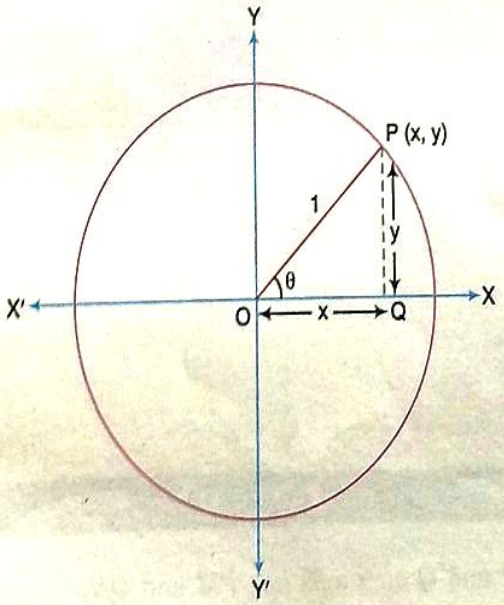

FIGURE 17.1

$$\cos\theta = \frac{x}{1} \text{ and } \sin\theta = \frac{y}{1}$$

$$\Rightarrow \quad x = \cos\theta \text{ and } y = \sin\theta$$

- $\vec{a} \cdot \vec{b} = |\vec{a}|\ |\vec{b}| \cos\theta$, where θ is the angle between $\vec{a}$ and $\vec{b}$.

MATERIAL REQUIRED

- Card board
- White sheets of paper
- Coloured pencils
- Eraser
- Cutter
- Protector

PROCEDURE

- Take a card-board and fix a white sheet on it using board pins.
- Draw two perpendicular lines in the middle of the paper and take them as x-axis (XOX') and y-axis YOY' (y-axis) intersecting each other at point O.
- Draw two unit vectors $\hat{OP}$ and $\hat{OQ}$ from O making angles A and B respectively with the positive direction of x-axis as shown in Fig. 17.2.

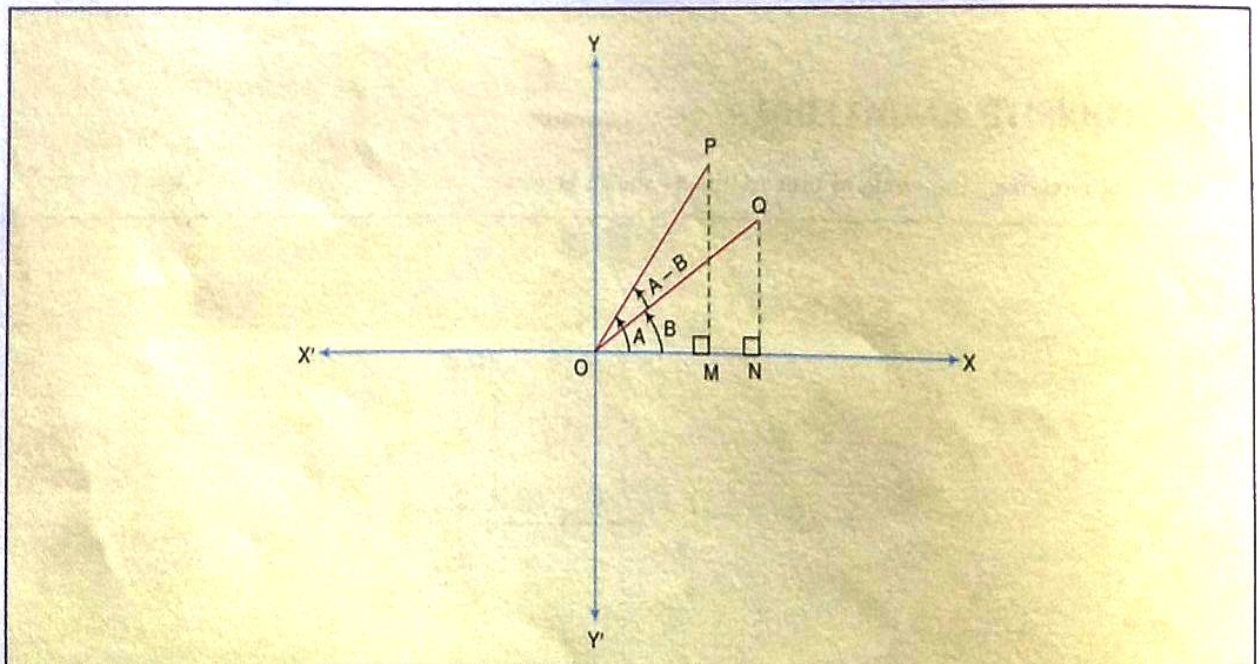

FIGURE 17.2

- Draw perpendicular from P and Q on x-axis *i.e.*, PM and QN.
- Construct $\angle POX = A, \quad \angle QOX = B$

  $\Rightarrow \quad \angle POX - \angle QOX = A - B$
- $\hat{OP} = \overrightarrow{OM} + \overrightarrow{MP},$

  $\hat{OQ} = \overrightarrow{ON} + \overrightarrow{NQ}$ (Using vectors)

$$\hat{OP} \cdot \hat{OQ} = |\overrightarrow{OP}||\overrightarrow{OQ}| \cos(A - B) \qquad [\because \vec{a} \cdot \vec{b} = |\vec{a}|\ |\vec{b}| \cos\theta]$$
$$= 1 \cdot 1 \cdot \cos(A - B) \qquad \ldots(i)$$

- In terms of components
- $$\hat{OP} = (i \cos A + j \sin A)$$
$$\hat{OQ} = (i \cos B + j \sin B) \qquad \text{(Using vectors)}$$

Using dot product, we get

$$\hat{OP} \cdot \hat{OQ} = (\hat{i} \cos A + \hat{j} \sin A) \cdot (\hat{i} \cos B + \hat{j} \sin B)$$
$$= \cos A \cos B + \sin A \sin B \qquad \ldots(ii)$$

[Using property of dot product of vectors]

- Using (i) and (ii),

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

OBSERVATIONS

- Take the different values of A and B.
  Let $A = 60°$ and $B = 45°$
- $A - B = 60° - 45° = 15°$
- $\cos(A - B) = \cos 60° \cos 45° + \sin 60° \sin 45°$
- Put the values of angles

$$\cos 60° = \frac{1}{2},\ \cos 45° = \frac{1}{\sqrt{2}},\ \sin 60° = \frac{\sqrt{3}}{2},\ \sin 45° = \frac{1}{\sqrt{2}}$$

$$\therefore \quad \cos(60° - 45°) = \frac{1}{2} \cdot \frac{1}{\sqrt{2}} + \frac{\sqrt{3}}{2} \cdot \frac{1}{\sqrt{2}}$$

- $\cos 15°$
$$= \frac{1+\sqrt{3}}{2\sqrt{2}}$$

- Taking $A = 45°$ and $B = 30°$, we can obtain the value of $\cos 15°$.

RESULT

$$\cos 15° = \frac{1+\sqrt{3}}{2\sqrt{2}}$$

APPLICATION

This activity can be performed for $\sin(A - B)$ also.

Autumn break homework
Session: 2020-2021
Class 12th
Subject: Biotechnology

Date: 20/10/2020

1. Prepare and complete the project file on the topics already allotted in the month of June.

2. Prepare your practical file with all work completed and with proper cover.

3. Solve the CBSE sample paper 20-2021 in the notebook and learn it.

4. Solve these following question in the notebook daywise. (Do not copy any questions just write the answer with proper serial number.)

Day 1

1. A biotechnologist wants to develop a varietyof rice, which can survive in high salinity. How can he do so?

2. Both PCR and M-13 bacteriophage can amplify DNA with respect to the DNA fragment obtained. What is the basic difference between thetwo?

3. Differentiate between finite and continuous cell lines.

4. Analysis of m-RNA in a given cell doesn't provide a direct reflection of its protein content. Give two reason to support thestatement.

5. Downstream processing becomes difficult and costly, if eukaryotic proteins are produced in prokaryotes. Give two reasons.

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6. How is the blue-white selection method used to screentransformed host cells?

7. Differentiate between primary and secondary metabolites in plants.

8. What are the main areas of consideration for safety aspects specific to Microbial Culture ? (Any three)

Day 2

1. a. Why do we need different kinds of cloning vectors?

b. What will you observe if you use a YAC vector prepared without Autonomously Replicating Sequence (ARS) a vector?

c. In order to produce a foreign protein in the host, what is the suitable vector ? State one special feature of these type of vectors.

2. Name 2 databases commonly used in bioinformatics. What all information do they respectively store? Name any one database retrieval tool and give its application.

3. Why do cereals and legumes have a limited nutritionalquality? Write two genetic engineering approaches that have been used to improve the seed protein quality.

4. a. What are Epitopes?
b. Differentiate between monoclonal and polyclonal antibodies.

5. Detergents now-a-days are provided with 'biologically active

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enzymes'.
(a) Name the enzyme commonly used.

(b) Why is this enzyme inactivated in the presence of bleach ?

(c) How is the engineered enzyme different from its natural form ?

Day 3

1. (a) Why are fermentors provided with baffles ?

(b) Foaming of (in) medium can hinder microbial growth. Why ?

(c) Microbial strains are usually exposed to chemicals like NTG (Nitrosoguanidine). Why ?

2. (a) What is a 'gene knockout' ?

(b) Why are mouse models prepared using gene knockouts useful ?

3. Who developed the technique to grow Human Embryonic Stem Cells (hESCs) in culture and what is the source of these cells ?

4. Define the terms : RefSeq, Homologues and Paralogs.

5. What is BLAST ? Write the principles that underlie BLAST search. Draw a labelled diagram showing the technique which can be used to identify and locate a specific sequence in a DNA gel using a probe.

6. Draw a diagram to show and compare the features of pBR 322 and YEp .

7. Why is YEp called a shuttle vector ?

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Day 4

1. (a) What are stem cells ?

(b) Differentiate between pluripotent and multipotent stem cells. Which of these act as repair system for the body and how ?

(c) Give three applications of stem cells in the field of medicine.

2. (a) How are edible vaccines produced ?

(b) Edible vaccines have advantages over recombinant vaccines produced by bacteria. List any three advantages.

3. (a) What are nutraceutical proteins ?

(b) Curd has been used as a pro-biotic. Why ?

4. (a) Whey protein can treat a spectrum of diseases. Explain.

(b) In which food system is the water binding property of whey protein used ?

5. (a) Why is sickle cell anaemia called a molecular disease?

(b) Describe the technique used to identify this disease in the laboratory.

(c) Who developed this technique?

6. Explain with suitable diagram, the steps and principle involved in Sanger's method of DNA sequencing.

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Day 5

1.. Justify the statements, giving reasons:

(a) Golden rice is nutritionally superior to normal rice.

(b) Edible vaccines are better than conventional vaccines.

(c) Plants are cheap chemical factories to produce thousands of chemical molecules.

2. Describe the important parts of a mass spectrometer with diagram. Describe its use in study of proteins.

3. With the help of suitable diagram, describe major steps in making of a 'recombinant plasmid'.

4. (a) Describe how hybridoma technology is used for producing monoclonal antibody.

(b) Enlist two therapeutic mAb, with their application.

5. Germplasm conservation through the conventional methods has many limitations.
Name any four.

6. Properties of proteins decide its purification scheme. Enlist any two such properties.

7. What are expression vectors ? What kind of promoter should be used in such vectors?

8. What is a metagenome? How is metagenomics used to screen for novel microbial products?

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