



**BLS INTERNATIONAL SCHOOL, HATHRAS**  
**SESSION 2019-2020**  
**SUMMER HOLIDAY HOMEWORK**

**Dear Parents,**

*Summer vacations are synonymous with fun, frolic, getting up late in the morning, playing for longer hours with friends, going for picnics, watching fun filled shows on T.V. but there is a lot more you can do to make their vacations more interesting and meaningful. As parents, it is important to invest your time with them now.*

- Look into the eyes of your little one and thank God for giving you such wonderful gift. In a few years from now, they will be soaring into greater heights.
- Allow your child to play outdoors, get hurt and get dirty. It's Okay for them to fall down and experience pain once in a while. Comfortable life within the sofa cushions will make your child lazy.
- Take them to relatives and friends to emphasize on how to meet & greet others.
- Allow them to adopt a pet, dog, a cat, a bird or a fish to understand the importance of life.
- Teach them a few folk songs and narrate stories or share your experiences which have some learning outcomes.
- Get some story books with colourful pictures and drawing materials for your kids.
- Keep your children away from TV, Mobile Phones, Computers and other electronic gadgets; they have their whole life for that.
- Avoid giving chocolates, jellies, cream cakes, chips, aerated drinks and too many bakery products like puffs and fried items like samosas.
- Encourage your child to cultivate the reading and writing habits.
- Converse with your child preferably in English to enhance communication skills.
- Assist your ward to complete the given home task before time.(H W enclosed)
- Submit Holiday Homework on the day the school reopens i.e. 1<sup>st</sup> July 2019.
- Subject Enrichment activity of 5 marks will be evaluated on the basis of the given Holiday Homework.
- For Classes IX to XII students must utilize this period to accomplish their task of revision, project file and practical file along with given assignment and preparation for upcoming tests.
- Do the given assessments fair note books as per the streams/subjects opted in class XI & XII.

***Hope you return rejuvenated and energetic on 1<sup>st</sup> July 2019 at BLS.***

Principal



**BLS INTERNATIONAL SCHOOL, HATRAS**  
**HOLIDAY HOMEWORK**  
**CLASS: XII**

**ENGLISH**

**Answer these in your fair notebook**

- Q1.** Pablo Neruda's poem is a simple yet powerful portrayal of how man's thirst for power through technological advancements has destroyed and depleted the ecosystem. Elucidate.
- Q2.** Yoga unites the body, mind and soul. When you are in harmony, the journey through life is calmer, happier and more fulfilling. Write a speech in 150-200 words to be delivered in the morning assembly on the topic 'Yoga- a way of life'. You are Surya/Suraiyya, Head Boy /Head Girl of APJ Public School, Delhi.
- Q3.** 'Homes for the aged is a necessity in India '. Write a debate in 150- 200 words either for or against the motion. You are Shivam/Shivani.
- Q4.** With a view to create awareness regarding health, St. Anne's school organized 'Health Mela' in the school premises. Various charts, models, fitness equipments were displayed. Lectures, debates, discussions, plays were organized. A workshop on low calorie cooking was also organized. Write a report in 150-200 words on the 'Health Mela' for the school magazine. You are Neel/Neelima, Secretary of the Health Club of school.
- Q5.** On the threshold of being a world super power, India does have a large young workforce but unfortunately not many in this force are employable for want of necessary skills. Write in about 150-200 words, an article for a newspaper on the topic' Skill Development is the need of the hour'. You are Mansi/Manav
- Q6.** You are Nitin/ Natasha, staying at 20, S.F.S. Flats, Worli, Mumbai. You bought a mobile phone from "Mobile Villa", Mahim, Mumbai. The phone developed a problem within a few days of the purchase. Write a letter to the Sales Manager of the showroom complaining about the defect and seeking immediate replacement.
- Q7.** You are Ridima/Ritik, student of class XII, Acme School, Kasaul. You are eager to enter the National Film Academy, Shimla, after your board results. Write a letter to the Director of the film academy seeking information regarding admission procedure, eligibility criteria, fee structure, placement opportunities, etc.
- Q8.** You are Arnit/Arnika .You want to sell your car as you are planning to buy a new one. Draft a suitable advertisement to be published in the Vehicles column of a newspaper
- Qs 9.** You are Krish Ahuja. You are opening an exclusive showroom of kids' apparel. Draft a formal invitation to be sent to some close friends and relatives on the opening ceremony of the showroom.

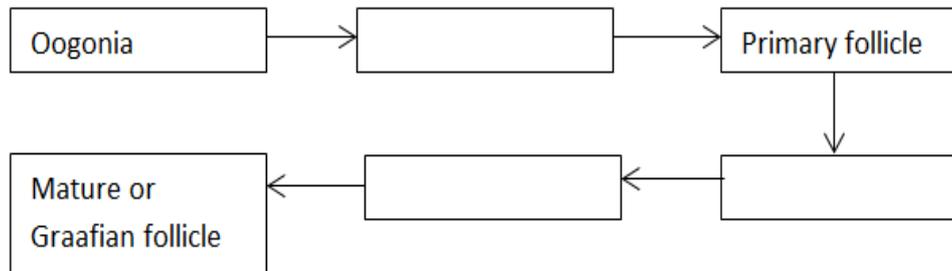
**MATHEMATICS**

**Do the three Assignments given in your fair Notebook and paste the Assignment sheet too.**

## BIOLOGY

### I. Assignment Questions

1. How is it that the embryo sacs of some apomictic species look normal but contain diploid cells?
2. Describe the structure of the embryo sac of a mature angiosperm. Explain the role of synergids in it.
3. Fill in the missing boxes for the levels in the transformation of mother germ cells into a mature follicle.



4. Why does corpus luteum stay active throughout pregnancy and in the absence of fertilization, is active only for 10-12 days?
5. Explain the role of pituitary gonadotropins during the follicular and ovulatory phases of the menstrual cycle. Describe the shifts in steroidal secretions
6. Explain in detail the various developmental stages of the zygote until implantation with suitable diagrams
7. What are the important features of an ideal contraceptive?
8. Justify the statement, “All reproductive tract infections are sexually transmitted diseases, but all sexually transmitted diseases are not reproductive tract infections.”
9. Justify the ban on amniocentesis in our country?
10. Why should sex education be introduced to school going children? List any five reasons.

### II. Do the investigatory project in File for AISSCE Board Examination

Sample Topics are AIDS, Common Cold, Viral Diseases, Human Diseases, Drugs Addiction, Malaria etc

## PHYSICAL EDUCATION

1. Do the cumulative analysis in your practical file on the given information.  
Athletics – History, Type of event, Standard Track 400m, Staggers, Type of track event  
Illustrate any two track events and any two field events.
2. Prepare a project file illustrating the proficiency in game and sports on any one of the given topics. Project file must include History, Measurement, Terminology, Latest rules ,  
Fundamental skill & Techniques, Important Tournament & Personals.

a- Basketball  
e- Volley ball

b- Football  
f- Hand ball

c- Kabaddi

d- Kho-Kho

## CHEMISTRY

- I. Prepare notes of **Ch-15 Chemistry in Everyday life**.
- II. Do the given assignment and attach assignment in C.W notebook.
- III. Do the investigatory project on any of the following assigned topics and prepare a file with viva  
**You can also choose any other topic of your choice**

1. Fermentation rate of various fruit samples
2. Metal coupling reaction
3. Drugs and their Action
4. Adulteration in various food Stuffs.
5. Metal complexes and their importance.
6. Extraction of nicotine from various samples of cigarette
7. Latest discoveries in the field of chemistry
8. Zeolites as a fertilizer
9. To analyse the contents of Chocolates.
10. To analyse the contents of cold drinks
11. Chemistry in black and white photography.
12. To analyse the contents of honey
13. Compare lactose percentage in whole milk and powdered milk
14. To study the constituents of an alloy
15. Preparation of ink

## PHYSICS

### I. Do the given Assignment Questions in your Fair Notebook

1. Derive an expression for the electric field  $E$  due to a dipole of length  $2L$  at a point distant  $r$  from the center of the dipole on the axial line. Also draw a graph of  $E$  v/s  $r$  for  $r \gg a$ .
2. What is Gauss's theorem? Give all applications of Gauss's Theorem.
3. Derive the expression for the energy stored in parallel plate capacitor. Hence obtain the expression for the energy density of the electric field.
4. Give the principle construction & working of a meter bridge.
5. Define EMF of a cell, show that the voltage drop across a resistor connected in parallel with a cell is different from the emf of the cell.
6. Define conductivity of a conductor. Explain briefly variation of resistivity with temperature in a metallic conductor & a semiconductor.
7. Using Gauss's law, show that no electric field intensity exist inside a hollow charged conducting sphere.
8. Outline the principle of potentiometer. How can its sensitivity be increased?
9. Why a potentiometer is preferred over the voltmeter to measure the EMF of a cell?
10. Define drift velocity. Obtain a relationship between electric current and drift velocity

### II. Make a project file as per the Investigatory Project topics allotted to you.

## **BUSINESS STUDIES**

### **I. Do the following assignment in your Fair Notebook**

1. Coordination is not a separate function of management. It is the essence of management. Explain with the help of suitable example.
2. "Management is a series of continuous interrelated functions with no predetermine sequence" Explain.
3. Explain the following principles of management given by Fayol's with example.  
a) Unity of command      b) Unity of direction      c) Equity
4. Why is in the present competitive market, it is essential for a business enterprise to remain Alert & Aware of its environment.
5. Explain with examples the various dimension of business environment.
6. Though planning is an important tool of management. Yet it is not a remedy for
7. Explain the plans. a) Objective      b) method      c) Rule.
8. What are the steps taken by management in Planning process.
9. What is the main objective of Time Study and Motion Study.

### **II. Prepare a project file on Marketing Management as per suggested topics given. You can also select the topic of your own choice as well**

Soaps, Shampoos, Cars, Hair conditioner, Shoes, Watches, etc.

## **ACCOUNTANCY**

1. Calculate/solve five questions each of the following mentioned topics:and do in your fair Notebook.
  - (i) Interest on Drawings
  - (ii) Profit and loss appropriation account
  - (iii) Past adjustment entries
  - (iv) Valuation of goodwill.
2. Collect the information of a company and include the following headings and prepare Project file as per CBSE Guidelines:
  - (i) History
  - (ii) Board of directors
  - (iii) Last 3 year's profit and loss account
  - (iv) Balance sheet of last 3 years
  - (v) Cash flow statement of last year

## **ECONOMICS**

1. Solve all the questions given in Indian Economy by Sandeep Garg from Chapter 1 to 7 in your fair Notebook.
2. Collect information on any one of the following topics and prepare Project File:
  - 1) Foreign Exchange
  - 2) Aggregate demand and its components
  - 3) RBI
  - 4) Commercial Banks

## SOCIOLOGY

1. **Project work: Prepare the Project File with PPT slide printouts on the given topics summarised in 15-20 pages in following sequential manner on topics mentioned below along with Viva.**
  1. **cover page: Project title, Student information, school and session.**
  2. **Second page: Content.**
  3. **Third page: Acknowledgement and preface.**
  4. **Fourth page: Introduction.**
  5. **Fifth page: Purpose for selecting the topic.**
  6. **Sixth page: Introductory questions and so on.**

**Chose from the given topics, one that you are detailed with**

1. Abortion: A heartless murder or a method of birth control?
2. On the life of disabled people in India
3. On new trends in family and marriage systems in India
4. The Mass media and their changing role in social life
5. Gender differences in the socialization of girls and boys
6. Child Labour in India
7. Role of communication media in social life
8. Changing aspirations of different age groups
9. Family planning programme in India
10. Social Media and Cyber Crime
11. Youth Culture
12. Social Movements
13. Class Conflict and Inequalities
14. Spirituality, Superstition, and Legends
15. Gender stereotypes in a relationship
16. Race, Nationality, and Ethnicity
17. Globalisation: Interlinking of Markets
18. The Struggle for women's equality and rights
19. Sociology of Gender and Sexuality

**I. Do the assignment in fair notebook with answers in about 200 words:**

1. In what ways does change in social structure lead to changes in the family structure?
2. Social inequalities differentiate between individuals. Highlight the principles to explain the concept of Social Stratification.
3. Colonialism introduced a wide range of change in every sphere, be it legal or cultural or architectural. Justify the statement with examples.
4. Read the given passage and answer the following questions :

### **The Indian Language Newspaper Revolution**

The most significant happening in the last few decades has been the Indian language newspaper revolution. The beginnings of this growth predated liberalization. The top two dailies in India are Dainik Jagran and Dainik Bhaskar with a readership of 21 million and 17 million, respectively. The fastest growing dailies are the Assamese dailies in urban areas (51.8 per cent increase) and the Bengali dailies in rural areas (129 per cent)

**Source : National Readership Survey 2002.**

The Eenadu story also exemplifies the success of the Indian language press. Ramoji Rao the founder of Eenadu, had successfully organized a chit-fund, before launching the paper in 1974. By associating with appropriate causes in the rural areas like the Anti-arrack movement in the mid-1980s, the Telugu newspaper was able to reach into the countryside. This prompted it to launch 'district dailies' in 1989. These were tabloid inserts of sensational features carrying news from particular districts as well as classified advertisements from villages and small towns of the same. By 1998 Eenadu was being published from ten towns in Andhra Pradesh and its circulation accounted for 70 per cent of the audited Telugu daily circulation.

- (a) What are the different forms of Print media ?
- (b) What reasons can be attributed to the emerging growth of Indian language newspapers ?

## **HISTORY**

**I. Prepare the Project File with PPT slide printouts on the given topics summarised in 15-20 pages in following sequential manner on topics mentioned below along with Viva.**

1. **cover page: Project title, Student information, school and session.**
2. **Second page: Content.**
3. **Third page: Acknowledgement and preface.**
4. **Fourth page: Introduction.**
5. **Fifth page: Purpose for selecting the topic.**
6. **Sixth page: Introductory questions and so on.**

**Chose from the given topics, one that you are detailed with**

- Partition of India in 1947 and its effects on common people
- Town planning of the Harappan civilization
- Through the Traveller's Eye - Ibn Battuta
- Role of Mahatama Gandhi in the freedom struggle of India
- Saanchi Stupa an important centre of Buddhism.

**II. Do the following assignment in your fair notebook**

1. Give an information about Francois Bernier and other writers who visited India after 1500 CE
2. What is the importance of emergence of Gupta Age in Indian History?
3. Write a note on the main sources of Mauryan Empire.
4. Describe the various stages through which Maharashtra Was compiled in the 20<sup>th</sup> century?
5. Explain how was the Buddhism texts gives a glimpse if discussion and debates among people of different schools of thoughts?
6. On the political map of India label and locate:\
  - (i) Harappan sites, Agriculture, Craft production
  - (ii) Mahajanapadas that had been included in the Mauryan Empire and Ashokan inscriptions have been found in these areas.
  - (iii) Important Buddhists sites.

## POLITICAL SCIENCE

**II. Project work: Prepare the Project File with PPT slide printouts on the given topics summarised in 15-20 pages in following sequential manner on topics mentioned below along with Viva.**

- 1. cover page: Project title, Student information, school and session.**
- 2. Second page: Content.**
- 3. Third page: Acknowledgement and preface.**
- 4. Fourth page: Introduction.**
- 5. Fifth page: Purpose for selecting the topic.**
- 6. Sixth page: Introductory questions and so on.**

**Chose from the given topics, one that you are detailed with**

- United Nations - its Principal organs and its role in Maintaining peace.
- Partition-1947- How , why and consequences.
- Problem of Jammu and Kashmir (article -370)
- India's relation with USA ,Russia and Post Communist Countries.
- Terrorism a Global issue.
- India's stand on Global Environmental debate.
- Challenges and Response in North-East (7 sisters)
- India's relation with its Neighbours.
- Popular movements in India.
- Anti- Sikh Riots and operation Blue star.

## COMPUTER SCIENCE

***I. Do the following programs in the practical file only***

1. WAP to convert a number from binary to decimal and decimal to binary
2. WAP to check a number is Armstrong or Not.
3. WAP to reverse the array with 10 elements.
4. WAP a menu driven program to find the area of circle, triangle and rectangle.
5. WAP to convert lower case letter to upper and vice-versa.
6. WAP to find area of triangle using function overloading.
7. WAP to find Matrices multiplication.
8. WAP to find the main Diagonal element of matrices.
9. WAP to check a string is Palindrome or Not.
10. Define a class with the following specification:
  - Private members: Admission number- an integer  
Name – string of 20 characters  
Class- integer  
Roll number- Integer
  - Public Members: Get data( )- to input the data  
Show data ( )- to display the data

Write a program to define an array of 10 objects of this class, input the data in this array and then display the list.

**II. Prepare a project file as per CBSE guidelines as per the topic already assigned.**

## INFORMATIVE PRACTICES

### I. Do the following programs in the Practical file

1. Design an application for a Football Match's Scoreboard. Each team's score should be maintained whenever a team scores a goal, it should be reflected on the Scoreboard. When the result is declared, depending upon the scorecard, the winning team should be declared.
2. Design a GUI application for an arithmetic calculator which should perform operations (+, -, \*, / and %).
3. Calculate commission for the salesman. The commission is calculated according to following rates:

Sales	Commission Rate
30002 onwards	15%
22001-30000	10%
12001-22000	7%
5001-12000	3%
0-5000	0%

4. Write code using 'for' loop to print numbers from 1 to 10.
5. Write code to print factorial of a given number.
6. Write Java code that takes the price of a pencil from jTextField1 and quantity of pencils from jTextField2 and calculates total amount as Price\*Quantity to be displayed in jTextField3 and also find 10% tax amount to be displayed in jTextField4.
7. Write code to print first 15 natural numbers and their sum.
8. Write code to print the sum of the following series:  
 $1 + 1/4 + 1/7 + 1/10 + 1/13 + 1/16 + 1/19 + 1/22 + 1/25$
9. Write code to print series of squares of first 10 natural numbers and their sum.
10. Write code to display the following series up to 10 terms:

10 13.5 17 20.5.....

11. Write code to print following pyramid:

```
5
4 4
3 3 3
2 2 2 2
1 1 1 1 1
```

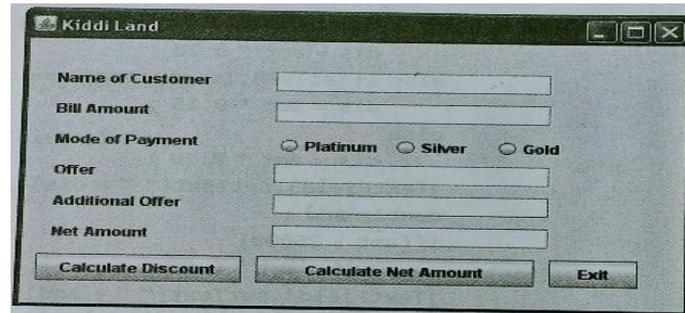
12. Write code to print following pyramid:

```
#
#*#
#*#*#
#*#*#*#
#*#*#*#*#
```

13. During a special sale at a store, a 10% discount is taken on purchases over Rs. 1000/-. Write a program that asks for the amount of purchases, then calculate the discounted price. The purchase amount will be input in Rs. :

```
Enter amount of purchases : 2000
Discounted Price           : 1800
```

14. Mr. Ram Kishore, the owner of the Kiddi Land Enterprises has asked his programmer Saumya to develop the following GUI in Netbeans:



Mr. Ram accepts payment through three types of credit cards. The offer is given according to following scheme:

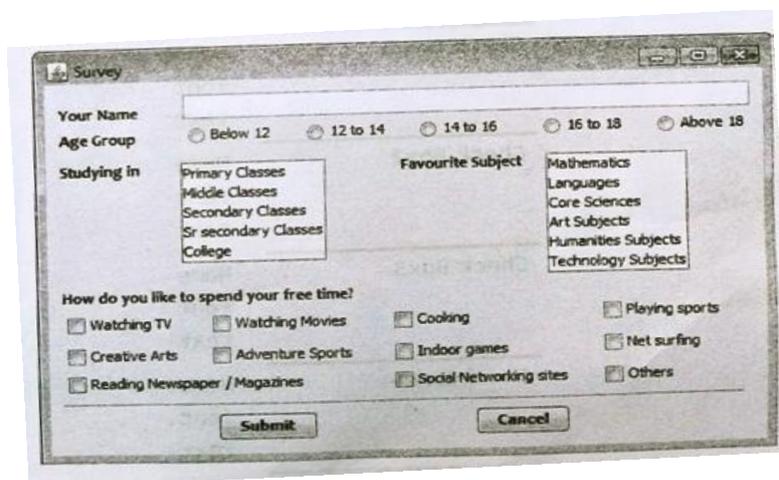
Type of Card	Offer
Platinum	20% of amount
Gold	15% of amount
Silver	10% of amount

If the Bill amount is more than Rs. 25000/- then the customer gets an additional offer of 5%.

Write Java code for the following:

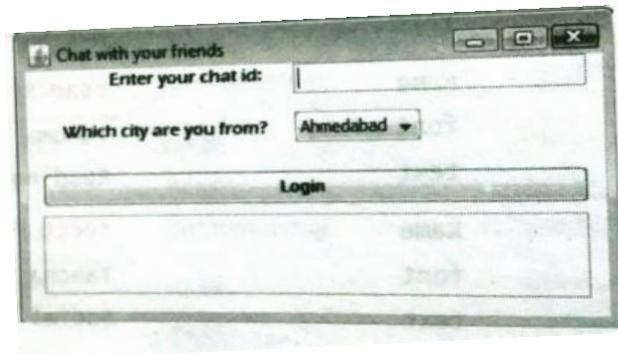
- (a) To assign Additional Offer as 0 (jTextField4) and Net amount as 0 (jTextField5). Also set them as un-editable.
- (b) [when “Calculate Offer” (jButton1) is clicked]
  - To calculate discount as per the given criteria and display the same in jTextField3.
  - To assign Additional offer (jTextField4) as 5% of amount (jTextField2) as per the above condition. To enable “Calculate Net Amount” (jButton2) button
- (c) [When “Calculate Net Amount” (jButton2) button is clicked]
  - To calculate Net Amount as
  - [TotalCost (jTextField2) – offer (jTextField3) – Additionaloffer (jTextField4)]
  - To display the Net Amount in jTextField5.

15. Department of Human Resources along with Department of Higher Education wants to conduct an online survey of school students’ time spending habits and their subject choices. It will help them design a better education policy and create better placement opportunities. Design a GUI application for this online survey.



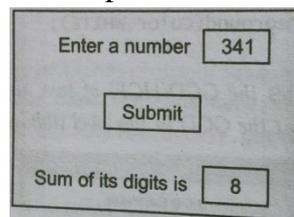
16. Schools from various cities in India have decided to form a network. This network is named as IndicSchoolNet. Apart from connecting teachers and other officials of different schools across the country, students can also benefit from this network. One such feature available for students is Chat with Your Friends wherein a student can chat with other students who are currently logged in the network.

Design a chat login window having interface similar to the one shown below. Add functionality to it to make it work.

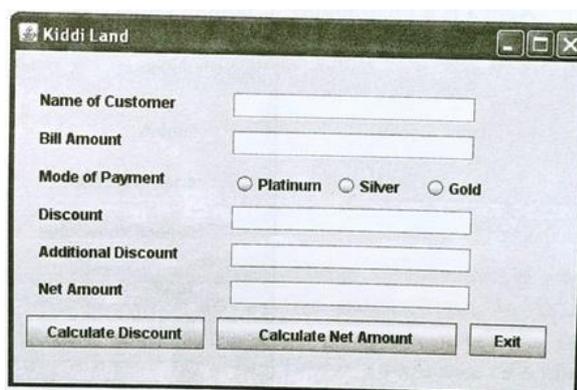


17. Design a GUI application to input any two numbers and calculate and print the LCM in the Label.

18. Create an application that receives a number through a text field and prints the sum of its individual digits when the Submit button is pressed as shown in following screenshot:



19. Mr. Raj Bansal the owner of the Kiddi Land Enterprises has asked his programmer Ekta to develop the following GUI in NetBeans:



Mr. Bansal accepts Payment through three types of credit cards. The discount is given according to the following scheme:

<i>Type of Card</i>	<i>Discount</i>
Platinum	20% of amount
Gold	15% of amount
Silver	10%

If the Bill amount is more than Rs. 30000/-  
Then the customer gets an additional offer of 5%.

Write Java code for the following:

- a. To assign Additional Discount as 0 (jTextField4) and Net amount as 0 (jTextField5). Also set them as un-editable.
- b. [when "Calculate Discount" (jButton1) is clicked]  
To calculate discount as per the given criteria and display the same in jTextField3.  
To assign Additional offer (jTextField4) as 5% of amount (jTextField2) as per the above condition.

To enable "Calculate Net Amount" (jButton2) button

- c. [When "Calculate Net Amount" (jButton2) button is clicked]  
To calculate Net Amount as  
[TotalCost (jTextField2) – Discount (jTextField3) – Additional Discount (jTextField4)]  
To display the Net Amount in jTextField5.

20. Computech company has number of employees who are divided into four grades as per their basic pay as the following:

<b>Salary</b>	<b>DA</b>	<b>HRA</b>
50000 or more	40% of salary	30% of salary
>= 35000 or <50000	40% of salary	25% of salary
>=20000 or <35000	30% of salary	20% of salary
<20000	30% of salary	15% of salary

**Calculate the tax as follows:**

<b>Annual Salary</b>	<b>Tax</b>
Less than 300000	nil
>=300000 and < 500000	10% of sal
>500000	15% of sal

**Test-2**

**Time- 1.5 hrs.**

**Marks-15x5**

**Inverse Trigonometric Functions**

Q.1. Find the value of :  $\tan^{-1}(1) + \cos^{-1}(-1/2) + \sin^{-1}(-1/2)$ .

Q.2. Prove :  $\tan^{-1}x + \tan^{-1} \frac{2x}{1-x^2} = \tan^{-1} \left( \frac{3x-x^3}{1-3x^2} \right), |x| < \frac{1}{\sqrt{3}}$

Q.3. If  $\tan^{-1} \frac{x-1}{x-2} + \tan^{-1} \frac{x+1}{x+2} = \frac{\pi}{4}$ , then find the value of x.

Q.4. Find the value of  $\sin \left( \frac{\pi}{3} - \sin^{-1} \left( \frac{-1}{2} \right) \right)$ .

Q.5. Prove :  $\sin^{-1} \frac{12}{13} + \cos^{-1} \frac{4}{5} + \tan^{-1} \frac{63}{16} = \pi$

Q.6. Solve :  $\tan^{-1}2x + \tan^{-1}3x = \frac{\pi}{4}$

Q.7. Prove :  $\frac{9\pi}{8} - \frac{9}{4} \sin^{-1} \frac{1}{3} = \frac{9}{4} \sin^{-1} \frac{2\sqrt{2}}{3}$

Q.8. Solve :  $\sin^{-1}(1-x) - 2\sin^{-1}x = \frac{\pi}{2}$ .

Q.9. Evaluate:  $\tan^{-1}\sqrt{3} - \sec^{-1}(-2) + \operatorname{cosec}^{-1} \frac{2}{\sqrt{3}}$ .

Q.10. Prove :  $\tan^{-1} \left\{ \frac{\sqrt{1+\cos x} + \sqrt{1-\cos x}}{\sqrt{1+\cos x} - \sqrt{1-\cos x}} \right\} = \frac{\pi}{4} + \frac{x}{2}$

Q.11. Simplify:  $\sin^{-1} \left( \frac{\sin x + \cos x}{\sqrt{2}} \right), -\frac{\pi}{4} < x < \frac{\pi}{4}$ .

Q.12. Prove:  $\sec^2(\tan^{-1}2) + \operatorname{cosec}^2(\cot^{-1}3) = 15$ .

Q.13. Simplify :  $\tan^{-1} \left( \frac{a \cos x - b \sin x}{b \cos x + a \sin x} \right)$

Q.14. Prove :  $\tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{7} + \tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{8} = \frac{\pi}{4}$

Q.15. If  $\sin(\sin^{-1} \frac{1}{5} + \cos^{-1} x) = 1$ , then find the value of x.

### Test-3

Time- 1.5 hrs.  
12x5

Marks-

### Matrices

- Q.1. Construct a  $3 \times 4$  matrix, whose elements are given by  $a_{ij} = \frac{1}{2}|-3i + j|$
- Q.2. If  $A = \begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix}$ , then find the matrix X, such that  $2A + 3X = 5B$ .
- Q.3. If  $A = \begin{bmatrix} 0 & -\tan \alpha/2 \\ \tan \alpha/2 & 0 \end{bmatrix}$  and  $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ , then show that  $I+A = (I-A) \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$
- Q.4. Express the matrix  $A = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$  as the sum of symmetric & skew-symmetric matrix.
- Q.5. Obtain the inverse of the matrix  $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$  using elementary transformations.
- Q.6. If  $f(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$  Prove that  $f(x) \cdot f(y) = f(x + y)$
- Q.7. If A and B are invertible matrices of the same order, then prove that  $(AB)^{-1} = B^{-1}A^{-1}$
- Q.8. Let  $f(x) = x^2 - 5x + 6$ . Find  $f(A)$  If  $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$
- Q.9. If  $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$  Show that  $A^2 - 5A + 7I = 0$ , Use this to find  $A^4$ .
- Q.10. Find the values of x, y, z if the matrix  $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$  satisfy the equation  $A'A = I_3$ .
- Q.11. Prove that the product of matrices  $\begin{bmatrix} \cos^2 \theta & \cos \theta \sin \theta \\ \cos \theta \sin \theta & \sin^2 \theta \end{bmatrix}$  and  $\begin{bmatrix} \cos^2 \phi & \cos \phi \sin \phi \\ \cos \phi \sin \phi & \sin^2 \phi \end{bmatrix}$  is the null matrix, when  $\theta$  and  $\phi$  differ by an odd multiple of  $\frac{\pi}{2}$ .
- Q.12. Show that the following system of equations is consistent  $2x - y + 3z = 5$ ,  $3x + 2y - z = 7$ ,  $4x + 5y - 5z = 9$ , Also, find the solution.

Test-4

Time- 1.5 hrs.  
10x5

Marks-

Determinants

Q.1. Prove that :  $\begin{vmatrix} 1 & x & x^2 \\ x^2 & 1 & x \\ x & x^2 & 1 \end{vmatrix} = (1-x^3)^2$

Q.2. Find the equation of the line joining A(1,3) and B(0,0) using determinants and find if D (K, 0) is a point such that area of a triangle ABD is 3 square units.

Q.3. If  $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$  Verify that  $A^3 - 6A^2 + 9A - 4I = 0$  and hence find  $A^{-1}$

Q.4. Prove that :  $\begin{vmatrix} a+bx & c+dx & p+qx \\ ax+b & cx+d & px+q \\ u & v & \omega \end{vmatrix} = (1-x^2) \begin{vmatrix} a & c & p \\ b & d & q \\ u & v & \omega \end{vmatrix}$

Q.5. Solve by Matrix method:

$$\begin{aligned} 2x + y + z &= 1 \\ x - 2y - z &= 3/2 \\ 3y - 5z &= 9 \end{aligned}$$

Q.6. Prove that :

$$\begin{vmatrix} a & a+b & a+b+c \\ 2a & 3a+2b & 4a+3b+2c \\ 3a & 6a+3b & 10a+6b+3c \end{vmatrix} = a^3$$

Q.7. Prove that :  $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc + bc + ca + ab.$

Q.8. Solve :  $\begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ x-4 & 2x-9 & 3x-16 \\ x-8 & 2x-27 & 3x-64 \end{vmatrix} = 0$

Q.9. Using determinants, find the area of the triangle whose vertices are (1, 4), (2, 3), (-5, 3). Are the given points collinear?

Q.10. If the points  $(a_1, b_1)$ ,  $(a_2, b_2)$  and  $(a_1 + a_2, b_1 + b_2)$  are collinear, Show that  $a_1b_2 = a_2b_1$ .