## SUBJECT-ENGLISH

**Instructions**

1. Attempt all questions neatly and accurately
2. For question    1 prepare a project file choosing any one topic (with all sub parts) out of the given topics.
3. For question 2 prepare any 3 topics out of the given for ASL (Speaking)

Q1.

# English Core (301)
## Session 2021-22
## Term II
## Project Portfolio/Project Report
## Topics List with the Tasks

*General Instructions:*

- *It is compulsory for all to prepare the Project file.*
- *The Internal Assessment of Term II will be in the form of Project Portfolio/Project Report and Viva. Both Project and Viva will carry 5 Marks each.*
- *The Internal Assessment of Term II will be taken by an external examiner. The Project File of yours will be checked by the external examiner. The Viva will also be taken by him/her on the same time.*
- *The Project Report is needed to be completed in 1000 words in your own handwriting.*

### Project-Portfolio/ Project Report

The Project-Portfolios is a compilation of the work that the students produce during the process of working on their ALS Project. The Project-Portfolio may include the following:

### PROJECT FILE

**Page 1 :** COVER PAGE, WITH TITLE OF PROJECT, SCHOOL DETAILS/DETAILS OF STUDENTS.

**Page 2 :** STATEMENT OF PURPOSE/OBJECTIVES/GOALS

**Page 3 :** CERTIFICATE OF COMPLETION UNDER THE GUIDANCE OF THE TEACHER.

**Page 4 :** ACTION PLAN FOR THE COMPLETION OF ASSIGNED TASKS.

**Mid Pages :** PROJECT/REPORT DETAILS( Graphics and pictures to be pasted on left hand side and content of the report to be written in your own handwriting on the right hand side of the page.

**Last Page :** LIST OF RESOURCES/BIBLIOGRAPHY

PROJECT TOPICS

You have to make pictorial as well as graphical presentation on left hand side of the file. All data should be collected authentically and hand written essay of 1000 words on right side.

TOPIC 1 -

The Last Lesson • Elaborate the theme of Linguistic Chauvinism and Procrastination and importance of Time Management.
 • Collect data about countries where people have these tendencies.

• How do they give importance to their mother tongue?

TOPIC 2 -

 The Lost Spring • Collect data about various slums in our country and living conditions there. Also elaborate whether children have access of education there.
 • How children are engaged in various kinds of

TOPIC 3-
My Mother At Sixty-six • Explain the importance of parents in the family.
• On the context of the poem how do you love and care your mother?
 • Collect data about condition of old age homes in our country, living condition there, number of old age homes

TOPIC 4 - Keeping Quiet • Collect reasons of environmental degradation.
 • How far is man harming the Earth?
• Focus on relevance of meditation and introspection.

TOPIC 5- The Third Level • Why 'hurry and worry' are trademarks of modern men?
• How far today life is insecure? Why do modern men want to escape?
• Interview your school principal or the counselor to know the problems (stress, fear, anxiety etc.) faced by the students in the virtual platform

TOPIC 6 - • Collect all about different kinds of freedom movements of our country.
• What was the importance of Champaran Movement?
• You can write about autobiography of any freedom fighter

Q2. Prepare any 3 out of the following topics for ASL.
(a) Corruption in India
(b) Digital India
(c) Make in India
(d) India Of My Dreams
(e) Indian Tourism
(f) India : The Land of Great Personalities
(g) Poverty in India
(h) My Favourite Book
(i) Impact of Smart Phones
(j) Online Learning

**Subject- Accountancy**

> **Q1. Why is the General Reserve distributed among old partners before a new partner is admitted?**

**(1)**

> **Q2. Differentiate between Average profit and Super profit.** **(1)**

**Q3.** A and B share profits and losses in the ratio of 4 : 3. They admit C with $3/7^{th}$ share, which he gets $2/7^{th}$ from A and $1/7^{th}$ from B. What is the new profit sharing ratio? (1)

**Q4. Give two circumstances under which the Fixed Capitals of partners may change.** (1)

**Q5. R, S and T entered into a partnership for manufacturing and distributing educational CDs on April 1, 2006. R looked after the business development, S content development and T financed the project. At the end of the year, S wanted 50% share in profit for the intellectual work he did. The other partners were not inclined to this. How would you resolve this on the basis of the provisions**

**of Indian Partnership Act,1932?** (1)

**Q6. The partnership deed provides that Alok, the partner, will get Rs.10,000 per month as salary.**

But, the remaining partners object to it. How will this matter be resolved? (1)

**Q7. A and B are partners sharing profits in the ratio of 3 : 2. A surrenders $1/6^{th}$ of his share and B surrenders $1/4^{th}$ of his share in favour of C, a new partner. What is the new ratio and the sacrificing ratio?** (1)

**Q8. A, B and C are partners sharing in the ratio of 3 : 2 : 1. They admit D for $1/6^{th}$ share. B would retain his original share. Calculate new profit sharing ratio.** (1)

**Q9. X and Y are partners in a firm sharing profits and losses in the ratio of 4 : 3. On April 1, 2009, they admitted Z as a new partner. Z brought in Rs.80,000 for his capital and Rs.21,000 for $1/3^{rd}$ share of goodwill premium. On Z's admission, goodwill appeared in books at Rs.28,000. Record necessary journal entries on Z's admission. (3)**

**Q10. A, B and C are partners in a firm. Though there is no provision in the partnership deed for interest on capital, this has been provided in the accounts @ 10% p.a. for two years ended on $31^{st}$ December,2009. Their Fixed capitals on which interest was calculated were throughout – A Rs.15,000; B Rs.12,000 and C Rs.9,000. Their profit sharing ratio is 2 : 2 :1. Pass necessary journal entry. (3)**

**Q11.** Ajit and Baljit were sharing profits in the ratio of 3 : 2.  They decided to admit Pratap into the partnership for 1/6th share of the future profits.  Goodwill, valued at four times the super profits of the firm, was Rs.18,000.  The firm had assets worth Rs.15 Lakhs and Liabilities Rs.12 Lakhs.  The normal earning capacity of such firms is expected to be 10% p.a.  Find the average profits earned by

the firm during the last four years.                                        (3)

**Q12.**  Prepare partners Capital Accounts for the year ended March 31, 2010:-

(i)     Initial Capital introduced on 1st April,2008: A –Rs. 30,000; B – Rs. 15,000 and C Rs.20,000. (ii)   Total Drawings during the year : A – Rs.3,000; B – Rs.1,500; and C – Rs. 2,000.

(iii)     A and B claim a fixed salary of Rs.5,000 p.a. and Rs.6,000 p.a. Respectively( agreed by all

        partners).

(iv)     C is allowed to claim commission @ 5% on gross sales which are Rs.2,20,000.

(v)     Share of profit: A – Rs. 4,000; B – Rs.2,000; and C – Rs.2,000.          (3)

**Q13.** Hari, Ravi and Kavi were partners in a firm sharing profits in the ratio of 3 : 2 : 1.  They admitted Gargi as a new partner for 1/7th share in the profits.  The new profit sharing ratio will be 2 : 2 : 2 : 1 respectively.  Gargi brought Rs.3,00,000 for her capital and Rs.45,000 for her 1/7th share of goodwill.

Pass necessary journal entries in the books of the firm.          (3)

**Q14.** A firm earns profits of Rs.1,00,000.  The Normal rate of return in a similar type of business is 10%.  The value of total assets (excluding Goodwill) and total liabilities as on the date of valuation of goodwill are Rs.12,00,000 and Rs.3,80,000 respectively.  Calculate the value of goodwill according to capitalization of super profit method. (3)

**Q15.** X, Y and Z are in partnership sharing profits and losses in the ratio of 5 : 4 : 1.  Two new partners R and S  join the firm.  The profits are now to be shared in the ratio of 3 : 4 : 2 : 2 : 1

respectively.  R is to pay Rs.30,000 for his share of goodwill and S has insufficient cash to pay for goodwill.  Both new partners introduced Rs.1,00,000 each as their capital.  You are required to pass

necessary journal entries. **(4)**

**Q16.** Ashok and Rajesh are partners sharing profits in the ratio of 7 : 3. Their capitals on 1st January,2008 were Rs.80,000 and Rs.60,000 respectively. They admitted Vijay into partnership on that date giving him a 1/5th share in the future profits, which he acquired equally from Ashok and Rajesh. Vijay is to bring in Rs.50,000 as his share of capital. Find new profit sharing ratio and record necessary journal entries. **(4)**

**Q17.** X, Y and Z are partners in a firm sharing profits and losses in the ratio of 5 : 3 : 2. Their fixed capitals were Rs.3,00,000, Rs.2,00,000 and rs.1,00,000 respectively. For the year 2008-09 interest on capital was credited to them @ 10% p.a. instead of 8%. Pass necessary adjustment entry.

**(4)**

**Q18.** P,Q and R are partners in a firm. Their capital accounts stood at Rs.30,000, Rs.15,000 and

Rs.15,000 respectively on 1st January, 2009. As per the provisions of the deed:-

   (i)     R was to be allowed a remuneration of Rs.3,000 p.a.;
   (ii)    Interest @ 5 % p.a. was to be provided on capital; (iii)
                Profits were to be divided in 2 : 2 : 1.

Ignoring the above terms, net profit of Rs.18,000 for the year ended December 31, 2009 was divided among the three partners equally.

Pass an adjustment entry. **(4)**

**Q19.** X and Y started a partnership business on 1st April, 2009. They contributed Rs.80,000 and Rs.60,000 respectively as their capitals. The terms of the partnership agreement are as follows:

   (i)     20% of profits (before any appropriations) is to be transferred to General Reserve.
   (ii)    Interest on capital @ 12% p.a. and interest on drawings @ 10% p.a.
   (iii)   X and Y to get a monthly salary of Rs.2,000 and Rs.3,000 respectively.
   (iv)    X is entitled to a commission of Rs.7,000.
   (v)     Profits and losses are to be shared in capital ratio.

Profit for the year ended 31st March,2010, before making above appropriations was Rs.1,25,375.

The drawings of X and Y were Rs.40,000 and Rs.50,000 respectively.

Prepare Profit and loss Appropriation A/c.                                                                    (4)

Q20. Usha and Asha are in partnership in the ratio 3 : 2.  Neelam is admitted into partnership giving  her 1/5$^{th}$ share in profits.  Neelam is to bring in Rs.30,000 as her capital and her share of goodwill in cash subject to the following terms:-

(i)     Goodwill of the firm is valued at Rs.50,000.

(ii)    Stock is to be reduced by Rs.3,000 and Provision for Bad Debts is to be reduced by Rs.2,400.

(iii)   There was a claim against the firm for damages amounting to Rs.2,000. The claim has now been accepted.

Pass necessary journal entries.          (4)

**Project file**- Comprehensive Project (Including imaginary story of starting Business must have atleast 25  Business transactions capital investment, Bank loan, Purchases, Sales ,GST ,Income And Expenditures,
Prepare Journal Entries,  ledger account, trial balance, Trading &profit and loss account and Balance Sheet.

**Subject- Busines Studies**

1.  "An organisation is a collection of diverse individuals with different needs." Which characteristics of management are highlighted in this statement?
2.  "A business needs to add to its prospects in the long run." Identify the organisational objectives highlighted in this statement. Explain other two objectives under this categories.
3.  Your father is working in an MNC as a Chief Operating Officer. At what level of management
    is he working? Also write three functions of this level.
4.  Tarang Enterprises Limited is planning to increase its sales by 30% in the next quarter. Identify the feature of management being highlighted in the given statement.
    (a) Management is all pervasive
    (b) Management is a goal oriented process
    (c) Management is a continuous process
    (d) All of the above
5.  Keeping in view the changes in the consumer demands and preferences 'Tasitemaker Bakery' has reduced the sugar and fat content in its products. This approach of business shows that management is
    (a) An intangible force
    (b) A group activity
    (c) A dynamic function
    (d) A multidimensional activity
6.  Management is considered to be an art because
    (a) The principles of management have universal validity
    (b) The principles of management have universal application

(c) Different principles of management are brought into effect differently by different managers

(d) It is not important for the practising managers to be a member of a professional association.

7. A.R. Rehman is the first Indian to win the Oscar award for his composition 'Jai Ho'. His composition of music is unique and different as he has used the singing notes in a manner that is entirely his own interpretation. Like A.R. Rehman, Nandan' General Manager in Sea Ltd, uses his knowledge of management in a unique and different manner and all the employees working under his guidance are happy and satisfied. He rewards the employees who come to office on time.

(a) Identify the nature of management highlighted above.

(b) State two other ways in which nature of management can be explained.

8. Shersingh works as a head mechanic in XYZ Ltd. (Machine assembling industry). He requires a number of tools while assembling the machine. For getting the tools, Shersingh has to move frequently to the tool room, which is situated away from the work place. Such frequent movements leads to wastage of lot of time and no steps are taken by the factory manager to eliminate such unnecessary movements of Shersingh and his co-workers.

(1) Which technique of Taylor is overlooked by the factory manager?

ii) How can the frequent movements be avoided? (iii) What kind of benefits will accrue to XYZ Ltd. after avoiding such unnecessary more effective

9. In the festive season, Shah Industries (leading manufacturers of gift items) decided to reduce the rest interval of workers from 30 minutes to just 7 minutes. However, due to heavy work load and reduction in time of rest interval, efficiency of workers went down and it led to fall in production level, instead of rising.

(1) Which technique of scientific management should be followed by Shah Industries? Also state

(ii) What should be done by the company to make the technique effective?

10. Read the following statements: Assertion and Reason. Choose one of the correct alternatives given below.

i. Assertion (A): Management Principles cannot be used as tailor-made tools and have to be adjusted as per demand of the situation.

Reason (R): Real business situations are very complex and dynamic

ii. Assertion (A): Principles of management are mainly behavioural in nature.

Reason (R): As human behaviour is very complex and dynamic in nature, management principles do not aim to influence such unpredictable behaviour.

Alternatives

a) Both Assertion (A) and Reason (R) are True and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are True and Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is True but Reason (R) is False.

(d) Assertion (A) is False but Reason (R) is True.

11. Principles of management equip the managers to foresee the cause and effect relationships of their decisions and actions so that the wastages associated with a trial and error approach can be overcome. Identify the point of significance of principles of management highlighted here.

**12.** Panchayats in our country have been given powers to decide and spend funds granted to them by the government for the welfare of villages." Identify the management principle highlighted in the given statement.

**13.** Principles of management can be modified by the manager when the situation demands. This statement implies that the principles of management are

(a) Rigid

(b) Contingent

(c) Flexible

(d) Universally applicable

**14.** The application of the principles of management has to be changed as per the requirements of the prevailing situation at a particular point of time. Which feature of the principles of management is being described in the given statement?

(a) Contingent

(b) Mainly behavioural

(c) Cause and effect relationship

(d) General guidelines

**15.** Pawan is working as a Production Manager in CFL Ltd. which manufactures CFL bulbs. There is no class-conflict between the management and workers. The working conditions are very good. The company is earning huge profits. As a policy, the management shares the profits earned with the workers because they believe in the prosperity of the employees. Identify the related principle of management and explain it.

**16.** Principles of Taylor and Fayol are mutually complementary. One believed that management should not close its ears to constructive suggestions made by the employees, while the other suggested that a good company should have an employee suggestion system, whereby suggestions which result in substantial time or cost reduction should be rewarded. Identify and explain the principles of Taylor and Fayol referred in the above para.

**17.** It is heartening that the implementation of compliance requirements of the Companies Act, 2013 has progressed substantially with NIFTY 500 companies. Data shows a significant increase in women's participation in the top management of Indian Companies from 5% few years ago to 13% now. Even companies which are not in NIFTY 500 have undertaken drives to increase women's participation across different areas of work. The government had also announced that it would support such companies. Identify and explain the dimensions of business environment discussed above which brought about the change.

**18.** Any kind of external devices, like compact discs (CD's) for computer, have become obsolete. Google, with its Google Drive service, Apple with its iCloud offering, enables the users store documents, photos, music and movies on web-based servers. Identify the feature of business environment being described in the above lines.

(a) Relativity

(b) Dynamic nature

(c) Uncertainty

(d) Interrelatedness

**19. The growing awareness about healthcare has led to an increase in the demand for healthcare products and services in the country. Identify the feature of business environment being described in the above case.**
**(a) Dynamic nature**
**(b) Uncertainty**
**(c) Relativity**
**(d) Interrelatedness**
**20. In order to boost and double India's export of goods and services to over USD 1,000 billion by 2025, it is important to lower effective corporate tax rate, bring down cost of capital and simplify regulatory and tax framework. Identify the related dimension of business environment.**

## Project work –
Prepare a project File on any one of the following topics
1 Principles of Management
2. Marketing
3. Stock Exchange

## Subject- Economics
**Activity 1**     write an article on India: Most populous country in the world (150words)
    **Activity 2**     Comic Character chacha Chaudhary and sabu debating on the economic reforms in india 1991 in conversation mode

**Activity 3**

| | |
|---|---|
| Project file as discussed in class<br>Write at least 20 pages<br>+ Watch movie Lagaan or Mother India<br>Write a movie review in 200 words. | Activity 4<br>Worksheet<br>shared in class<br>group |

## Subject – Main Maths

## Matrices and Determinants

1. If a matrix A = $[a_{ij}]$ of order 2 where $a_{ij} = 1 \ if \ i \neq j$ and $a_{ij} = 0 \ if \ i = j$, then matrix $A^4$ is equal to

   (a) A        (b) I        (c) –A        (d) None

2. If A is a square matrix such that $A^2 = I$, then the value of $(A - I)^3 + (A + I)^3 - 7A$

   (a) A        (b) I        (c) –A        (d) None

3. If A = $\begin{bmatrix} 3 & -3 \\ -3 & 3 \end{bmatrix}$ and $A^2 = kA$, then find the value of k.

   (a) 3        (b) 9        (c) 6        (d) -6

4. If A and B are two matrices of order $3 \times m$ and $3 \times n$ respectively and $m = n$, then the order of matrix 5A – 6B is

   (a) $3 \times m$        (b) $3 \times 3$        (c) $n \times m$        (d) None

5. If A = $\begin{bmatrix} 0 & i \\ i & 1 \end{bmatrix}$ and B = $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then the value of $|A| + |B|$ is

   (a) 1        (b) -1        (c) 0        (d) None

6. If A is a skew symmetric matrix of order 3, then the value of $|A|$ is

   (a) 1        (b) -1        (c) 0        (d) None

7. If A = $\begin{bmatrix} 1 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{bmatrix}$, then the value of $a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13}$ is

   (a) 6        (b) -8        (c) 8        (d) None

8. If A is a square matrix of order 3 and $|5A| = k|A|$, then the value of k is

   (a) 125        (b) 25        (c) -125        (d) None

9. If A and B are two matrices of order 3 and $|A| = 5$ and $|B| = 3$ then $|5AB|$ is equal to:

   (a) 1675        (b) 1775        (c) 1875        (d) None

10. If A is a square matrix of order 2 with $|A| = 5$, then $|2adjA|$ is equal to:

    (a)25        (b) -20        (c) 20        (d) None

11. For what values of x, the matrix A = $\begin{bmatrix} 5 - x & x + 1 \\ 2 & 4 \end{bmatrix}$

    (i) singular or $A^{-1}$ does not exist.

    (ii) non singular or $A^{-1}$ exists.

12. If A = $\begin{bmatrix} -2 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -2 \end{bmatrix}$, then value of $|adjA|$ and $|A.adjA|$.

13. If A is a matrix of order $3 \times 3$ where A = $[a_{ij}]$, then find matrix if

$$[a_{ij}] = \begin{cases} i + j \ if \ i < j \\ i - j \ if \ i = j \\ \frac{i}{j} \quad if \ i > j \end{cases}$$

14. If a matrix A is both symmetric and skew symmetric, then find the value of $|A|$.

15. If A is an invertible matrix of order $2 \times 2$ and $|A| = 7$, then find the value of $|A^{-1}|$ and $|-A^{-1}|$.

16. If A is non singular matrix of order 3 and $|A|=5$, then find the value of $|AA^{-1}|$.

17. Find the value of $x + 2y - z$ from the following equations by using matrix method:

    $x + y + z = 9$

    $x + z = 5$

    $y + z = 7$

18. Find matrix A if $\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 \\ 1 & -2 \\ 9 & 22 \end{bmatrix}$.

19. If $A = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 4 & -5 \\ 2 & -1 & 3 \end{bmatrix}$, find $A^{-1}$ and solve the following equations by using $A^{-1}$:

$x - y + 2z = 7$, $3x + 4y - 5z = -5$, $2x - y + 3z = 12$.

20. Solve the following equations using matrix method:

$$\frac{1}{x} - \frac{1}{y} + \frac{2}{z} = 7$$

$$\frac{3}{x} + \frac{4}{y} - \frac{5}{z} = -5$$

$$\frac{2}{x} - \frac{1}{y} + \frac{3}{z} = 12$$

21. If $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$, find the product AB and use the product to

solve the following equations:

$y + 2z = 7$

$x - y = 3$

$2x + 3y + 4z = 17$

22. If $A^{-1} = \begin{bmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$, find $(AB)^{-1}$.

23. If $A = \begin{bmatrix} -3 & -2 & -4 \\ 2 & 1 & 2 \\ 2 & 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 0 \\ -2 & -1 & -2 \\ 0 & -1 & 1 \end{bmatrix}$, then find AB and use it to solve the

following equations:

$x - 2y = 3$

$2x - y - z = 2$

$-2y + z = 3$

24. If (a, b), (c, d) and (e, f) are the vertices of $\triangle ABC$ and $\Delta$ denotes the area of $\triangle ABC$, then

$\begin{vmatrix} a & c & e \\ b & d & f \\ 1 & 1 & 1 \end{vmatrix}^2$ is equal to:

25. If $\begin{bmatrix} 2 & 0 \\ 5 & 4 \end{bmatrix} = P + Q$, where P is a symmetric and Q is a skew symmetric matrix, then P and Q

equal to:

26. If $|A| = |kA|$, where A is a square matrix of order 2, then find the sum of all possible values of k.

27. If $f(\alpha) = \begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$, prove that $f(\alpha).f(-\beta) = f(\alpha - \beta)$.

28. If $A = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ and $A + A' = I$, then find the value of $\alpha$.

29. If A is a matrix of order 3 with each entry 0 or 1, then find
   i) Number of such matrices.
   ii) Number of such symmetric matrices.
   iii) Number of such skew symmetric matrices.
   iv) Number of such matrices which are neither symmetric nor skew symmetric.

30. If A is a matrix of order 3 with each entry 1 or -1, then find

i) Number of such matrices.
ii) Number of such symmetric matrices.
iii) Number of such skew symmetric matrices.
iv) Number of such matrices which are neither symmetric nor skew symmetric.

## Vectors and 3-Dimensional Geometry

1. Find a vector whose magnitude is 7 units in the direction of vector $\vec{a} = \hat{i} - 2\hat{j}$.
   (a) $\frac{1}{\sqrt{5}}(7\hat{i} - 14\hat{j})$      (b) $(7\hat{i} - 14\hat{j})$      (c) $\frac{-1}{\sqrt{5}}(7\hat{i} - 14\hat{j})$      (d) None

2. Find the direction cosine of the vector $\vec{a} = \hat{i} + \hat{j} + \hat{k}$.
   (a) $(1, 1, 1)$      (b) $\left(\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$      (c) $\pm\left(\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$      (d) None

3. If point P and Q with position vectors $\overrightarrow{OP} = 3\vec{a} - 2\vec{b}$ and $\overrightarrow{OQ} = \vec{a} + \vec{b}$, then find the position vector of R which divides the line joining P and Q in the ratio 2 :1 internally.
   (a) $\frac{\vec{a}}{3}$      (b) $\frac{2\vec{a}}{3}$      (c) $\frac{5\vec{a}}{3}$      (d) None

4. Find the projection of the vector $\vec{a} = 2\hat{i} + 3\hat{j} + 2\hat{k}$ on the vector $\vec{b} = \hat{i} + 2\hat{j} + \hat{k}$.
   (a) $5\sqrt{6}$      (b) $3\sqrt{6}$      (c) $\sqrt{6}$      (d) None

5. If two vectors $\vec{a}$ and $\vec{b}$ are such that $|\vec{a}| = 2$, $|\vec{b}| = 3$ and $\vec{a}.\vec{b} = 4$, then find $|a - b|$.
   (a) $\sqrt{3}$      (b) $\sqrt{5}$      (c) 5      (d) None

6. If $|\vec{a}| = \sqrt{3}$, $|\vec{b}| = 2$ and $\vec{a}.\vec{b} = \sqrt{6}$, then find the angle between $\vec{a}$ and $\vec{b}$.

7. Let $\vec{a}$ and $\vec{b}$ be two unit vectors and $\theta$ be the angle between them. If $\vec{a} + \vec{b}$ is a unit vector then find angle $\theta$.

8. If a line makes angle $90^0$, $60^0$ and $30^0$ with positive direction of x, y and z axis then find direction cosine of that line.

9. Find the value of p for which the vector $3\hat{i} + 2\hat{j} + 9\hat{k}$ and $\hat{i} - 2\hat{j} + 3\hat{k}$ are parrellel.

10. Find the shortest distance of the lines whose vectors equations are
    $\vec{r} = (\hat{i} + \hat{j}) + \lambda(2\hat{i} - \hat{j} + \hat{k})$ and $\vec{r} = (2\hat{i} - \hat{j} + \hat{k}) + \mu(3\hat{i} - 5\hat{j} + 2\hat{k})$

11. Find the vector equation of the line passing through the point (1, 2, -4) and perpendicular to the lines $\frac{x-8}{3} = \frac{y+19}{-16} = \frac{z-10}{7}$ and $\frac{x-15}{3} = \frac{y-29}{8} = \frac{z-5}{-5}$

12. Show that the lines $\frac{x+1}{3} = \frac{y+3}{5} = \frac{z+5}{7}$ and $\frac{x-2}{1} = \frac{y-4}{3} = \frac{z-6}{5}$ intersect. Also find the intersection point.

13. Find the image of the point P(1, 6, 3) on the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$. Also find the distance of foot and point P.

14. The Cartesian equation of line is $6x - 2 = 3y + 1 = 2z - 2$, then find direction ratio of parallel vector $\vec{b}$ and also find the equation of line parallel to this line and passing through the point (2, -1, -1).

15. If $\hat{a}, \hat{b}, \hat{c}$ are mutually perpendicular unit vectors then find the value of $|2\hat{a} + \hat{b} + \hat{c}|$.

16. Write a unit vector perpendicular to both the vectors $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + \hat{j}$.

17. If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, then find $(\vec{r} \times \hat{i}).(\vec{r} \times \hat{j}) + xy$.

18. Find value of p for which the vectors $3\hat{i} + 2\hat{j} + 9\hat{k}$ and $\hat{i} - 2p\hat{j} + 3\hat{k}$ are parallel.

19. Vectors $\vec{a}, \vec{b}$ and $\vec{c}$ are such that $\vec{a} + \vec{b} + \vec{c} = 0$ and $|\vec{a}| = 3, |\vec{b}| = 5, |\vec{c}| = 7$, then find the angle between $\vec{a}$ and $\vec{b}$.

20. Let $\vec{a} = \hat{i} + 4\hat{j} + 2\hat{k}, \vec{b} = 3\hat{i} - 2\hat{j} + 7\hat{k}$ and $\vec{c} = 2\hat{i} - \hat{j} + 4\hat{k}$ are three vectors. Find a vector $\vec{p}$ which is perpendicular to both $\vec{a}$ and $\vec{b}$ and $\vec{p}.\vec{c} = 18$.

21. Prove that $\left|\vec{a} \times \vec{b}\right|^2 = \begin{vmatrix} \vec{a}.\vec{a} & \vec{a}.\vec{b} \\ \vec{a}.\vec{b} & \vec{b}.\vec{b} \end{vmatrix}$.

22. If $\hat{a}$ and $\hat{b}$ are unit vectors and $\theta$ be the angle between them, then prove that $sin\frac{\theta}{2} = \frac{1}{2}|\hat{a} - \hat{b}|$.

23. If $\vec{a}, \vec{b}$ and $\vec{c}$ are three non zero unequal vectors such that $\vec{a}.\vec{b} = \vec{a}.\vec{c}$, then find the angle between $\vec{a}$ and $\vec{b} - \vec{c}$.

24. Find the equation of the diagonals of the parallelogram PQRS whose vertices are P(4, 2, -6), Q(5, -3, 1), R(12, 4, 5) and S(11,9, -2). Use these equations to find the point of intersection of diagonals.

25. A line l passes through point (-1, 3, -2) and is perpendicular to both the lines $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and $\frac{x+2}{-3} = \frac{y-1}{2} = \frac{z+1}{5}$. Find the vector equation of the line l. Hence obtain its distance from origin.

**Note:- Write all the trigonometric formulas of Class XI in your class notebook and also learn them.**

<span style="color:red">**Subject – Applied Maths**</span>

# APPLIED MATHEMATICS

1. If a matrix $A = [a_{ij}]$ of order 2 where $a_{ij} = 1 \ if \ i \neq j$ and $a_{ij} = 0 \ if \ i = j$, then find the value of $A^3$ and $A^4$.

2. If A is a square matrix such that $A^2 = I$, then find the value of $(A - I)^3 + (A + I)^3 - 7A$.

3. A matrix of order $3 \times 3$ where $A = [a_{ij}]$, then find matrix if
$$[a_{ij}] = \begin{cases} i + j \ if \ i < j \\ i - j \ if \ i = j \\ \frac{i}{j} \quad if \ i > j \end{cases}$$

4. If $A = \begin{bmatrix} 3 & -3 \\ -3 & 3 \end{bmatrix}$ and $A^2 = kA$, then find the value of k.

5. If A and B are two matrices of order $3 \times m$ and $3 \times n$ respectively and $m = n$, then find the order of matrix $5A - 6B$.

6. If A is a skew symmetric matrix of order 3, then find the value of $|A|$.

7. If $A = \begin{bmatrix} 1 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{bmatrix}$, then find the value of $a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13}$.

8. If A is a square matrix of order 3 and $|5A| = k|A|$. Find the value of k.

9. If A and B are two matrices of order 3 and $|A| = 5$ and $|B| = 3$ then find the value of $|AB|$ and $|5AB|$.

10. For what values of x, the matrix $A = \begin{bmatrix} 5 - x & x + 1 \\ 2 & 4 \end{bmatrix}$
    (i) singular or $A^{-1}$ does not exist.
    (ii) non singular or $A^{-1}$ exists.

11. If A is a square matrix of order 2 with $|A| = 5$, then find the value of $|adjA|$, $|A.adjA|$ and $|2.adjA|$

12. If $A = \begin{bmatrix} -2 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -2 \end{bmatrix}$, then value of $|adjA|$ and $|A.adjA|$.

13. If a matrix A is both symmetric and skew symmetric, then find the value of $|A|$.

14. If A is an invertible matrix of order $2 \times 2$ and $|A| = 7$, then find the value of $|A^{-1}|$ and $|-A^{-1}|$.

15. Find matrix A if $\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 \\ 1 & -2 \\ 9 & 22 \end{bmatrix}$.

16. If $A = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 4 & -5 \\ 2 & -1 & 3 \end{bmatrix}$, find $A^{-1}$ and solve the following equations by using $A^{-1}$:
    $x - y + 2z = 7, 3x + 4y - 5z = -5, 2x - y + 3z = 12$.

17. Solve the following equations using matrix method:
$$\frac{1}{x} - \frac{1}{y} + \frac{2}{z} = 7$$
$$\frac{3}{x} + \frac{4}{y} - \frac{5}{z} = -5$$
$$\frac{2}{x} - \frac{1}{y} + \frac{3}{z} = 12$$

18. If $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$, find the product AB and use the product to solve the following equations:

$x - y = 3$

$2x + 3y + 4z = 17$

$y + 2z = 7$

19. If $A^{-1} = \begin{bmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$, find $(AB)^{-1}$.

20. If $A = \begin{bmatrix} -3 & -2 & -4 \\ 2 & 1 & 2 \\ 2 & 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 0 \\ -2 & -1 & -2 \\ 0 & -1 & 1 \end{bmatrix}$, then find AB and use it to solve the following equations:

$x - 2y = 3$

$2x - y - z = 2$

$-2y + z = 3$

21. If $|A| = |kA|$, where A is a square matrix of order 2, then find the sum of all possible values of k.

22. Solve the following equations by Cramer's Rule:

$x - y + 2z = 7,\ 3x + 4y - 5z = -5,\ 2x - y + 3z = 12$.

23. If A is a matrix of order 3 with each entry 0 or 1, then find
    i) Number of such matrices.
    ii) Number of such symmetric matrices.

24. If A is a matrix of order 3 with each entry 1 or -1, then find
    i) Number of such matrices.
    ii) Number of such symmetric matrices.

25. Find the present value of a sequence of payments of 60 made at the end of each 6 months and continuing forever, if money is worth 4% compounded semi-annually?

26. How much money is needed to endure a series of lectures costing 2500 at the beginning of each year indefinitely, if money is worth 3% compounded annually?

27. A company establishes sinking fund to provide for the payment of Rs. 1,00,000 debt maturing in 4 years. Contributions to the fund are to be made at the end of every year. Find the amount of each annual deposit if interest is 18% per annum.

28. In 10 years, a machine costing 40,000 will have a salvage value of 4,000. A New Machine at that time is expected to sell for 52,000. In order to provide funds for the difference between the replacement cost and the salvage cost, a sinking fund is set up into which equal payments are placed at the end of each year. If the fund earns interest at the rate 7% compounded annually, how much should each payment be?

29. Mr. X takes a loan of Rs. 2, 00,000 with 10% annual interest rate for 5 years. Calculate EMI under Flat Rate system.

30. A couple wishes to purchase a house for Rs. 12, 00,000 with a down payment of Rs. 2, 50,000. If they can amortize the balance at 9% per annum compounded monthly for 20 years, find (i) What is their each monthly payment (ii) What is the total interest paid.

**Subject- Entrepreneurship**
**Project file on Business Plan**

**Subject Music**

**Project File:**
1.    Introduction of Raag Bhairav
2.    Notation of Drut Khayal of Raag Bhairav
3.    Introduction of Jhaptaal
4.    Leykari of Jhaptaal (Thah(Ekgun),Dogun,Tigun,Chaugun).
5.    Introduction of Roopak Taal
6.    Leykari of Roopak Taal (Thah(Ekgun),Dogun,Tigun,Chaugun).

**Subject- Painting**
1. Hand made Rangoli
2. Lippan Art on Card Board

**Subject- Home Science**
**Project work:**
1. Market survey of any five processed food, their packaging and label information.
2. Write the merits and demerits of all the packaging material used.
Note: Learn all the work done in the class.