KENDRIYA VIDYALAYA AFS SULUR

SUMMER HOLIDAYS HOME WORK(2023)

CLASS:12 Subject: English

PROJECT WORK

PROJECT WORK + VIVA = 10 MARKS

5 MARKS FOR PROJECT REPORT/ SCRIPT/ESSAY ETC

5 MARKS FOR VIVA

THEME:

INTER-DISCIPILINARY

IDEAS/ISSUES HIGHLIGHTED IN THE CHAPTERS /POEMS/DRAMAS FROM THE PRESCRIBED BOOKS

ANY RELEVANT AND AGE-APPROPRIATE THEME

INTERVIEW BASED RESEARCH

LISTENING TO PODCASTS/INTERVIEWS/RADIO/TV DOCUMENTARY AND PREPARING A REPORT COUNTERING OR AGREEING WITH THE SPEAKERS

CREATING THEIR OWN VIDEO/AUDIO AFTER WRITING A SCRIPT

WRITE, DIRECT AND PRESENT A THEATRICAL PRODUCTION/ONE ACT PLAY:

PLANNING PREPARATION AND PRESENTATION

RESEARCHING, DISCUSSION, WRITING A SCRIPT, AUDITIONING, PRODUCING A PLAY + VIVA

ASSESSMENT OF PROJECT WORK

QUALITY OF CONTENT OF THE PROJECT

ACCURACY OF INFORMATION

ADHERENCE TO THE SPECIFIED TIMELINE

CONTENT IN RESPECT OF (SPELLING,GRAMMAR,PUNCTUATION)

CLARITY OF THOUGHTS AND IDEAS

CREATIVITY

CONTRIBUITIONS BY GROUP MEMBERS

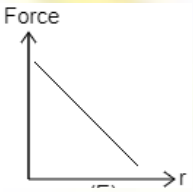
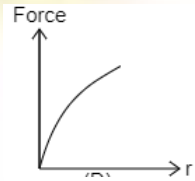
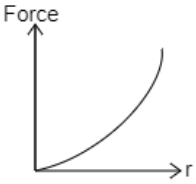
KNOWLEDGE AND EXPERIENCE GAINED

CLASS 12 – SUBJECT: CHEMISTRY

1. State Henry's Law.
2. Why do mountaineers carry oxygen cylinder while climbing mountains?
3. State Raoult's Law.
4. What are the factors on which vapour pressure depends?
5. Name two ways by which vapour pressure of a liquid can be lowered.
6. Define the term colligative properties?
7. Give the characteristics of ideal solution?
8. What are the possible deviations from ideal behaviors?
9. Give one example of each deviation?
10. Define the term azeotrope?
11. Why is the boiling point elevated when a non – volatile solute is dissolved in a liquid?
12. Define cryoscopic constant?
13. What happens when red blood cells are placed in 0.1% NaCl solution?
14. When does the measurement of colligative property leads to abnormal molecular
mass?
15. A solution of glucose in water is labelled as 10% w/w, what would be the molality and mole fraction of each component in the solution? If the density of solution is 1 .2 g m/L, then what shall be the molarity of the solution?
16. A sample of drinking water was found to be severely contaminated with chloroform (CHCl3), supposed to be a carcinogen. The level of contamination was 15 ppm (by mass).
(i) express this in percent by mass.
(ii) determine the molality of chloroform in the water sample.
17. Heptane and octane form an ideal solution. At 373 K, the vapour pressures of the two liquid components are 105.2 kPa and 46.8 kPa respectively. What will be the vapour pressure of a mixture of 26.0 g of heptane and 35.0 g of octane?
18. Calculate the amount of benzoic acid (C5H5COOH) required for preparing 250 mL of 0· 15 M solution in methanol.
19. Calculate the depression in the freezing point of water when 10g of CH3CH2CHClCOOH is added to 250g of water. Ka = 1.4 x 1o-3 Kg = 1.86 K kg/mol.
20. Vapour pressure of water at 293 K is 17·535 mm Hg. Calculate the vapour pressure of water at 293 K when 25 g of glucose is dissolved in 450 g of water.
21.Henry's law constant for the molality of methane in benzene at 298 K is 4.27 x 105 mm Hg. Calculate the solubility of methane in benzene at 298 K under 760 mm Hg.
22. Benzene and toluene form ideal solution over the entire range of composition. The vapour pressure of pure benzene and toluene at 300 K are 50.71 mm Hg and 32.06 mm Hg respectively. Calculate the mole fraction of benzene in vapour phase if 80g of benzene is mixed with 100g of toluene.
23. The air is a mixture of a number of gases. The major components are oxygen and nitrogen with an approximate proportion of 20% is to 79% by volume at 298 K. The water is in equilibrium with air at a pressure of 10 atm. At 298 K if Henry's law constants for oxygen and nitrogen are 3.30 x 107 mm and 6.51 x 107 mm respectively, calculate the composition of these gases in water.
24. Determine the amount of CaCl2 (i = 2.47) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm at 27°C.

25. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K2SO4 in 2 litre of water at 25°C, assuming that it is completely dissociated.

CLASS:12B Physics

01	The force between two electrons separated by a distance 'r' in vacuum is 'F'. What is the force between the same two charges separated by the same distance in a dielectric medium of constant 3. (A) F (B) 3F (C) 0.3F (D) 0.03F
02	which of the following graphs shows the correct variation of force when the distance 'r' between two charges varies? (A)  (B)  (C)  (D) 
03	If $\oint \mathbf{E} \bullet d\mathbf{S} = 0$ for a given surface, it concludes that (A)Electric field is perpendicular to the surface (B) Electric flux is outward from the surface (C) Electric field is zero on the surface (D) Electric flux is zero on the surface
04	The number of electric field lines from a charge of 9C is (A)1.12×10^{11} (B) 1.01×10^{12} (C) 8.85×10^{12} (D) 0.88×10^{12}
05	**Assertion**:- The net charge of an electric dipole is zero, but the electric field due to dipole is not zero. **Reason**:-Charge is a scalar quantity and the electric field is a vector quantity (A)Both Assertion and Reason are correct and Reason is the correct explanation of Assertion (B) Both Assertion and Reason are correct and Reason is not the correct explanation of Assertion (C) Assertion is correct but Reason is wrong (D) Assertion is wrong but Reason is correct (E) Both Assertion and Reason are wrong
06	A metallic spherical shell of radius 2cm filled with a dielectric medium of constant 3, has charges 3C at the centre,1C on the surface and −2C outside the shell. Find the electric flux through the shell.
08	Define electric field lines. Draw field lines for (i) $q_1q_2 > 0$ and (ii) $q_1q_2 < 0$.
09	A charge 2C is placed at the centre of cube of side "r". What is the electric flux passing through each face of the cube? Given $\varepsilon_0 = 8.85 \times 10^{-12}\ C^2/N\ m^2$
10	Define electric dipole moment with formula. Write the unit and direction.
11	A uniformly charged conducting sphere of diameter 1.2m has a surface charge density $60\mu C/m^2$. Find the charge on the sphere.
12	A infinite line of charge produce a electric field of 6×10^4 N/C at a distance of 3cm. Calculate the linear charge density.

13	Two point charges 3μC and --3μC are located at 20cm apart in vacuum. (i) What is the electric field at the midpoint of the line joining the two charges?(ii) If a negative charge of magnitude 1.5nC is placed at this point, what is the force experienced by this charge ?
14	Three charges 5μC,10μC and --10μC are kept in air at the corners of an equilateral triangle having each side equal to 5cm. Determine the resultant force on a charge of 5μC.
15	An electric dipole is kept in external uniform electric field making an angle 'θ' with the field. (i) Find the torque on the dipole (ii) Show diagrammatically the orientation of the dipole in the field for which torque is (A) maximum (B) zero and (C) half maximum
16	(i) Find the electric field at the equatorial plane of a electric dipole of length '2a' (ii) What will be the net force and torque when the dipole of dipole moment 'p' is held (a) parallel and (b) antiparallel to a non-uniform electric field?
17	(i) State Gauss's law and find the electric field due to uniformly charged spherical shell at a point (a)inside and (b) outside the shell (ii) Show graphically the variation of electric field with distance. (iii) A charge 'q' is enclosed by a spherical Gaussian surface of radius'r'. If the radius is doubled, what is the change in electric flux of the surface?
18	State four properties of electric field lines
19	Fine the electric field due to uniformly charged thin sheet using gauss;s law
20	Find the expression for electric potential due to a electric dipole at a point on (i)axial line and (ii) equatorial line.

Class:12 Subject: Computer Science

1. Define computer networks and its advantages?
2. What is switching technique and explain its types
3. Give the definition of the following terms

- Baud
- Band with
- modem
- RJ-45
- Nic
- IP Address
- Mac address

4. Define transmission medium and explain its types
5. Define topology. Explain about star, bus, and tree topology with its advantages and disadvantages
6. Define protocol and write a line about each of the following protocols

- TCP/IP

- HTTP
- FTP
- PPP
- SMTP
- POP3
- IMAP
- Telnet
- CDMA
- GSM
- WLC

7. Explain about the types of networks

- PAN
- LAN
- MAN
- WAN

8. Define the following terms with examples

- Viruses
- Worms
- Trojan horses
- Spams
- Firewall
- Cookies
- Cybercrime
- Web browser
- Web server
- Web hosting

9. Difference between following terms

- Hacker and cracker
- HTML and XML
- Wi-fi and Wi-Max

The following programs should be done in record with

the same order

1. Min max sum using user defined functions

2. Checking palindrome using user defined functions

3. Print the series up to n numbers

4. Counting the number of occurrences

5. Area of circle, triangle (using herons' formula), volume of sphere using user defined functions

CLASS XII ECONOMICS

TOPI C	PAGE NO	QUESTION NO.
BASIC AGGREGATE OF NATIONAL INCOME	3.17	1&2
BASIC AGGREGATE OF NATIONAL INCOME	3.18	3 TO 6
BASIC AGGREGATE OF NATIONAL INCOME	3.19	7 TO 10

SELECT ANY 1 TOPIC AND MAKE PROJECT ABOUT IT.

CLASS-12 SUBJECT-ACCOUNTANCY

1. What is the minimum and maximum number of partners in all partnership? Which Act defines the maximum number of Partners in a Partnership Firm?

2. In the absence of a partnership deed, how are mutual relations of partners governed?

3. Why is it important to have a partnership deed in writing?

4. What do you understand by fixed capital of partners?

5.What do you understand by fluctuating capital of partners?

6.Give two circumstances in which the fixed capital of partners may change.

7. List the items that may appear on the debit and credit sides of a partner's fluctuating capital account.

8. Ramesh, a partner in the firm has advanced a loan of a Rs. 1,00,000 to the firm and has demanded on interest @ 9% per annum. The partnership deed is silent on the matter. How will you deal with it?

9. A and B are partners sharing profits in the ratio of 3: 2 with capitals of Rs. 5, 00,000 and Rs. 3, 00,000 respectively. Interest on capital is agreed @ 6% p.a. B is to be allowed an annual salary of Rs. 25000. During 2006, the profits of the year prior to calculation of interest on capital but after charging B's salary

amounted to Rs. 1,25,000. Prepare an account showing the allocation of profits and partners' capital accounts.

10. Vikash and Arjun are partners sharing profits in the ratio of 2:3. Akash contributed Rs. 30,00,000 as capital. The Partnership Deed provides for interest on capital @ 8% p. a. and salary to Arun Rs. 40,000 per month.

Profit before providing for interest on capital and partner's salary was Rs. 2,70,000.

Show the distribution of profit (Prepare Profit and Loss Appropriation Account).

11. A and B are partners with capitals of Rs. 10,00,000 each. As per the Partnership Deed both are to get monthly salary of Rs.20,000 each and interest on capitals @ 10%.

Interest on drawings are A- Rs. 30,000 and B- Rs. 40,000.During the year , the firm incurred a loss of Rs.4,00,000.

Pass journal entries and Prepare Profit and Loss Appropriation Account.

12. A and B are partners with a capitals of Rs.5,00,000 and Rs. 3,00,000 respectively on 1st April,2022.Net Profit for the year ending 31st March, 2023 (before giving effect to the Partnership Deed) was Rs. 1,20,000.The Partnership Deed provides for the following:

(i) B is to get salary of Rs. 40,000 p.a.

(ii) Interest on capital is to be allowed @ 6% p.a.

Drawings of the Partners of A and B were Rs.60,000 and Rs. 40,000 respectively and interest on drawings for A being Rs. 3000, and B Rs. 2000.

Prepare Profit and Loss Appropriation account and Partners capital accounts as per fluctuating method.

13. The partnership deed is silent on payment of salary to partners. Anita, a partner, claimed that, since she managed the business, she should get a monthly salary of Rs 10,000. Is she entitled for the salary? Give reason.

14. What share of profit would a 'sleeping partner', who has contributed 75% of the total capital, get in the absence of a deed?

15. Is a sleeping partner liable for the acts of other partners?

16. Would a 'charitable dispensary' run by 8 members be deemed a partnership firm? Give reason in support of your answer.

17. What is meant by 'unlimited liability of a partner'?

18. A, B and C decided that interest on capitals will be provided to each partner @ 5% per annum, but after one year C wants that no interest on capital is to be provided to any partner. State how 'C' can do this?

19. Can a partner be exempted from sharing the losses in a firm? If yes, under what circumstances?

20. Do all firms need a deed and registration?

21. Suresh and Ramesh are partners in a firm with capitals of t 3,00,000 and ? 4,00,000 respectively. They do not have a partnership deed. Ramesh wants to share the profits in the ratio of capitals. State with reason whether the claim is valid.

22. A partnership deed provides for the payment of interest on capital but there was a loss instead of profit during the year 2010-2011. At what rate will the interest on capital be allowed?

CLASS-XII SUBJECT-BUSINESS STUDIES

1. Which one of the following sequence of process of management is correct:
(a) Planning, Controlling, Organising, Staffing
(b) Staffing, Planning, Organising, Controlling
(c) Planning, Organising, Staffing, Controlling
(d) Organising, Planning, Staffing, Controlling

2. Management is important because:
(a) It helps in achieving group goals
(b) It helps in development of society
(c) It increases efficiency
(d) All of the above

3. "Coordination is not a separate function of management but it happens to be thefinal truth of all functions." In what context this observation has been made?
(a) Coordination is the essence of management
(b) Coordination is not established automatically
(c) Coordination is a continuously moving process
(d) None of these

4. Policy formulation is the function of
(a) top level managers (b) middle level managers
(c) operational management (d) all of the above

5. Assertion (A): Management is a universal activity.
Reason (R): Management is followed only in business organisations all over the world.
Options:
(i) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(ii) Both Assertion (A) and Reason (R) are true and Reason (R) is not correct explanation of Assertion (A).
(iii) Assertion (A) is true but Reason (R) is false.
(iv) Assertion (A) is false but Reason (R) is true.

6. Assertion (A): Management helps in creating dynamic organisation.
Reason (R): Management helps people to adopt changes so that the organization is
able to maintain its competitive edge.
Options:
(i) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(ii) Both Assertion (A) and Reason (R) are true and Reason (R) is not correct

explanation of Assertion (A).
(iii) Assertion (A) is true but Reason (R) is false.
(iv) Assertion (A) is false but Reason (R) is true.

7. Assertion (A): Profit is only main objective of every management.
Reason (R): Profit is necessary for the existence of business.
Options:
(i) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(ii) Both Assertion (A) and Reason (R) are true and Reason (R) is not correct explanation of Assertion (A).
(iii) Assertion (A) is true but Reason (R) is false.

(iv) Assertion (A) is false but Reason (R) is true.

8. In order to become a lawyer one has to register himself as a member of Bar Council of
India. Which feature of profession is being revealed?
a) Ethical code of conduct
b) Restricted entry
c) Service motive
d) Professional association

9. Which level of management is responsible to ensure their department has the necessary personnel?
a) Supervisory level
b) Middle level
c) Operational level
d) Top level

10. Dheerj is working as 'Operations Manager in JK Ltd.
Name the managerial level at which he is working. State any four functions he will
perform as 'Operations Manager' in this company.

11. Saurabh is managing director in a shoe manufacturing company. He has been doing
well at this post. Under his guidance and leadership, the company has been actively
achieving all the set targets as all the unrelated and diverse actions taken by different
departments are given a common direction.
Identify the characteristic of management discussed in the given case.
(a) Management is a goal oriented process
(b) Management is a continuous process
(c) Management is a group activity
(d) Management is a dynamic function

12. 'Management cannot be seen but its presence can be felt in the way the organisation
functions.'
Which characteristic of management is mentioned in the given statement.
(a) Management is multidimensional
(b) Management is all pervasive
(c) Management is an intangible force

(d) Management is a dynamic function

13. Identify the nature of management when a manager applies the existing theoretical
Knowledge in his own unique manner. (Choose the correct alternative)
(a) Management as a Science
(b) Management as an Art
(c) Management as a profession
(d) Management as a Discipline

14. Which of the following is a feature of art?
(a) Existence of theoretical knowledge
(b) Systematised body of knowledge
(c) Service motive
(d) Ethical code of conduct

15. Mega Ltd was manufacturing water-heaters. In the first year of its operations, the
revenue earned by the company was just sufficient to meet its costs. To increase the
revenue, the company analysed the reasons of less revenues. After analysis the company decided
(i) To reduce the labour cost by shifting the manufacturing unit to a backward area
where labour was available at a very low rate.
(ii) To start manufacturing solar water-heaters and reduce the production of electric
water-heaters slowly.
This will not only help in covering the risks, but also help in meeting other objectives
too.
(a) Identify and explain the objectives of management discussed above.

16. Raman is working as a plant superintendent in Tifco Ltd. Name the managerial level at which he is working? State any four functions he will perform as plant superintendent in this company.

17. Govinda Ltd.is a highly reputed Company. Different functions are performed by
different individuals in this company, who are bound together in a hierarchy of relationships. Every individual in the hierarchy is responsible for successful completion of a particular task. Mr.Gauranga is responsible for the welfare and survival of the organization. He formulates overall organizational goals and strategies
for their achievement. MR.Nityanand ensures that quality of output is maintained,
wastage of materials is minimized and safety standards are maintained. Mr.Sanatan
assigns necessary duties and responsibilities to the personnel and motivates them to
achieve desired objectives
At what levels of management are MR.Gauranga, Mr.Nityanand and Mr.Sanatan working in Govinda Ltd.? justify your answer.

18. Anju and Manju are good friends. After completing their masters in business management, both of them take up a job at managerial level in different organizations as per their individual areas of interest. Anju tales up a marketing job in a retail company and strives to increase sales where as Manju joins an NGO and works diligently to realize its objective related to providing employment to differently abled persons. Both of them have to perform a series of continuous, composite, but separate functions. On some days, Anju may spend more time in planning a future display layout and on another day, she may spend time in sorting out an employee's problem. Both Anju and Manju make conscious efforts to build a feeling of team spirit and coordination among diverse individuals with different needs who work under them. The effect of their management is noticeable in their respective departments as the targets are met according to plans, employees are happy and satisfied, and there is orderliness in its functioning rather than chaos.
In context of the above case:
Identify the various features of management highlighted in the above paragraph.

19. Esha works as the cost and risk management head of a company in power sector. As a result of her excellent managerial competence, the company is able to reduce costs and increase productivity. The company belongs to infrastructure sector, where regular amendments are being made in the government regulations and policies. She holds regular meetings to ensure that people in her department are not only aware of the related changes but are also able to adapt to these changes effectively. This helps the company to maintain its competitive edge. She motivates and leads her team in such a manner that individual members are able to achieve personal goals while contributing to the overall organizational objective. In the process of fulfilling her duties for the growth of the organization, she helps in providing competitive services, adopting new technology, creating more employment opportunities etc. for the greater good of the people at large.
In context of the above case:
Identify the various reasons that have made management so important by quoting lines from the paragraph.

20. Human Resources are Organisation's greatest assets. Despite all developments in technology "getting work done from people "is still a major task of manager. Identify the dimension of management being described above.

a) Management of work b) Management of People

c)Management of operations d) All of the above

21. Ankita has started a new business of providing organic vegetables and fruits. She is trying to offer goods at minimum price so that she is able to survive in market and make sure people with limited income can also afford her vegetables and fruits.

State the two objectives she is trying to achieve:

a) Organisational and personal b) Organisational and social

c) Social and personal d) All of the above

22. Management has its own vocabulary of terms and concepts. Managers need to communicate with one another of a common vocabulary for the better understanding of their work situation. Which characteristic of " Management as a Science" is highlighted in the above statement?

a) Principles based on experimentation

b)Systematised body of knowledge

c) Universal validity

d) Personalised application.

23. Alfanzo Ltd. is earning enough revenue to cover costs and the risk of business. Now the company wants to increase the sales volume, the capital investment, the number of employees and the number of products also.

By doing this, the management wants to achieve its following objective:

a) Survival b) Profit c) Personal d) Growth

24. Hitesh is the Chief Executive Officer of "Kids Garments Ltd."Due to festive season, Hitesh got an additional order of 10,000 garments which he had to supply within two days. He did not want to loose the order, so he decided to achieve the target by operating on double shifts. He achieved the target and supplied the order within two days. But due to double shifts, his cost of production was higher than the regular production cost.

Identify and give the meaning of the two concepts of management discussed in the above para.

Class:12 Subject: Biology

1.Lesson - Sexual reproduction in flowering plants

2.Lesson - Human Reproduction Exercise questions.

3. Record work

ग्रीष्मकालीन अवकाश गह कार्य कक्षा 12वीं (हहदी)

1. ननम्नललखित ववषर्ों पर 200 शब्दों में फ़ीचर ललखिए ।

(I) विज्ञापनों की लभाि्नी दनु नया

(II) बाल श्रमिकों की सिस्या

2. ननम्नललखि्त ववषर्ों पर कम से कम 100-100 छेद ललखिए। शब्दों में अनच्

(I) सिाचार पत्र **(II)** रेडियो **(III)** इटरनेट **(IV)** टेलीविजन

3. ननम्नललखि्त ववषर्ों पर ननबध ललखि्ए।

(I) यि्ा पीढी और दशे का भविष्य

(II) आज के विद्यार्थी के सामने चुनौतियां

4. निम्नलिखित विषयों में से किसी एक विषय पर परियोजना बनाइए -

(I) रस

(II) अलंकार

(III) हिन्दी साहित्य का इतिहास

(IV) पसंदीदा कवि/ लेखक

[टिप्पणी- प्रश्न 1,2 और 3,अपनी अभ्यास पुस्तिका में हल करें तथा प्रश्न 4 के लिए A4 शीट का सहप्रयोग करें ।]

CLASS – 12 IP

Answer the following questions after reading the chapter.

1. Define Computer Networks. Mention its advantages and disadvantages.

2. Define the following terms:

a) Host/Node

b) Server

c) Client

d) NIC

e) Communication Channel/Media. Mention its types with examples.

3. Explain the types of networks with the key characteristic features of each type of network.

4. Define Topology and explain about Star,Bus, Tree and Mesh topologies with its advantages and disadvantages.

5. Define the following network devices:

a) Modem

b) Hub

c) Switch

d) Repeater

e) Router

f) Bridge

g) Gateway

6. Define the following terms:

a) Internet

b) WWW

c) Email

d) Chat

e) VoIP

7. Differentiate between the following terms:

a) Website and Webpage

b) Web Server and Web Browser

c) Static and Dynamic Web Page

8. Define the following terms:

a) Add-ons with 5 examples

b) Plugins with 5examples

c) Cookies

d) Web Hosting

9. Write the first practical which is signed in observation note in record note.

XII-MATHS: QUESTION BANK IN DIFFERENTIATION(SECOND ORDER DERIVATIVES)

1. If $y = \frac{\sin^{-1} x}{\sqrt{1-x^2}}$, show that $(1 - x^2)\frac{d^2y}{dx^2} - 3x\frac{dy}{dx} - y = 0$.

2. If $y = e^{a\sin^{-1}x}$, $-1 \le x \le 1$, show that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} - a^2y = 0$

3. If $y = \text{cosec}^{-1}x$, $x > 1$, then show that $x(x^2 - 1)\frac{d^2y}{dx^2} + (2x^2 - 1)\frac{dy}{dx} = 0$.

4. If $y = \left(x+\sqrt{x^2+1}\right)^m$, then show that $(x^2+1)\frac{d^2y}{dx^2} + x\frac{dy}{dx} - m^2y = 0$.

5. If $y = \log\left[x+\sqrt{x^2+a^2}\right]$, show that $(x^2+a^2)\frac{d^2y}{dx^2} + x\frac{dy}{dx} = 0$.

6. If $x = a\cos^3\theta$ and $y = a\sin^3\theta$, find the value of $\frac{d^2y}{dx^2}$ at $\theta = \frac{\pi}{6}$

7. If x = a cos θ + b sin θ and y = a sin θ - b cos θ , show that $y^2\frac{d^2y}{dx^2}-x\frac{dy}{dx}+y=0$.

8. If y = sin (log x), prove that $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}+y=0$.

9. If $y = x^x$, prove that $\frac{d^2y}{dx^2}-\frac{1}{y}\left(\frac{dy}{dx}\right)^2-\frac{y}{x}=0$.

10. If $y = e^x (\sin x + \cos x)$, prove that $\frac{d^2y}{dx^2}-2\frac{dy}{dx}+2y=0$

11. If $x=\tan\left(\frac{1}{a}\log y\right), \text{show that } (1+x^2)\frac{d^2y}{dx^2}+(2x-a)\frac{dy}{dx}=0.$

12. If $y = e^x \tan^{-1}x$, show that $(1+x^2)\frac{d^2y}{dx^2}-2(1-x+x^2)\frac{dy}{dx}+(1-x)^2y = 0.$

13. If $y = \log\tan\left(\frac{\pi}{4}+\frac{x}{2}\right)$, show that $\frac{dy}{dx} =$ sec x. Also, find the value of $\frac{d^2y}{dx^2}$ at $x = \frac{\pi}{4}$

14.. If y = tanx + sec x , show that $\frac{d^2y}{dx^2}=\frac{\cos x}{(1-\sin x)^2}$.

15. $\text{If } x^{13}y^7=(x+y)^{20}, \text{prove that } \frac{dy}{dx}=\frac{y}{x}.$
