



Navyug Vidyalaya, Bhagalpur

Class-XII

Assignment-III Session (2020-21)

Subject - Maths (A. K. Mishra 9472288312)

Inverse Trigonometric Functions

1. Prove that

$$(i) \tan\left(\frac{1}{2} \sin^{-1} \frac{3}{4}\right) = \frac{4-\sqrt{7}}{3}$$

$$(ii) \frac{9\pi}{8} - \frac{9}{4} \sin^{-1}\left(\frac{1}{3}\right) = \frac{9}{4} \sin^{-1} \frac{2\sqrt{2}}{3}$$

$$(iii) \cos \cdot \tan^{-1} \cdot \sin \cdot \cot^{-1} x = \sqrt{\frac{x^2+1}{x^2+2}}$$

$$(iv) \tan\left(\frac{\pi}{4} + \frac{1}{2} \cos^{-1} \frac{a}{b}\right) + \tan^{-1}\left(\frac{\pi}{4} - \frac{1}{2} \cos^{-1} \frac{a}{b}\right) = \frac{2b}{a}$$

$$(v) \cot^{-1} 9 + \operatorname{cosec}^{-1} \frac{\sqrt{41}}{4} = \frac{\pi}{4}$$

2. If $\cos^{-1}\left(\frac{x}{a}\right) + \cos^{-1}\left(\frac{y}{b}\right) = \alpha$, prove that

$$\frac{x^2}{a^2} - \frac{2xy}{ab} (\cos \alpha) + \frac{y^2}{b^2} = \sin^2 \alpha$$

3. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \pi$ prove that

$$x\sqrt{1-x^2} + y\sqrt{1-y^2} + z\sqrt{1-z^2} = 2xyz$$

4. Solve for x

$$(i) \tan^{-1} a x + \frac{1}{2} \sec^{-1} b x = \frac{\pi}{4}$$

$$(ii) \sin^{-1} x + \sin^{-1} 2x = \frac{\pi}{3}$$

5. Establish simplest form

$$(i) \cos^{-1} \sqrt{\frac{\sqrt{1+x^2}+1}{2\sqrt{1+x^2}}} \quad (ii) \cos^2 \left[\tan^{-1} \sqrt{\frac{1-x}{1+x}} \right]$$

CALCULUS

6. Find $\frac{dy}{dx}$ if

$$(i) y = \frac{\sin^2 x}{1 + \cos^2 x}$$

$$(ii) y = \cos x^3 \cdot \sin^2(x^5)$$

$$(iii) y = \sin \sqrt{\cos \sqrt{\tan \sqrt{\sec \sqrt{mx}}}}$$

$$(iv) y = \left(\frac{2 \tan x}{\tan x + \cos x} \right)^2$$

$$(v) y = \cos^{-1} \left(\frac{x-x^{-1}}{x+x^{-1}} \right)$$

$$(vi) y = \tan^{-1} \left[\frac{\sqrt{1+x^4} - \sqrt{1-x^4}}{\sqrt{1+x^4} + \sqrt{1-x^4}} \right]$$

$$(vii) \quad y = \sin^{-1} \left[\frac{5x + 12\sqrt{1-x^2}}{13} \right]$$

$$(viii) \quad y = \tan^{-1} \frac{2^{x+1}}{1-4^x}$$

$$(ix) \quad y = \sec^{-1} \left(\frac{\sqrt{x}+1}{\sqrt{x}-1} \right) + \sin^{-1} \left(\frac{\sqrt{x}-1}{\sqrt{x}+1} \right)$$

$$(x) \quad y = \tan^{-1} \left(\frac{\sqrt{1+x^2}+1}{x} \right)$$

Subject- English Core (Parijat Jha 9973394677)

Book-Flamingo(Lost Spring)

Write the answers of the following qs:(30-40words)

1. Why doesn't Saheb go to school?
2. Why is Seemapuri far away from Delhi?
3. How can Mukesh realise his dream?
4. Why can't they organise themselves?
5. How can they come out of the vicious circle of poverty?

(125-150 words)

Speaking Skill : A speech on Mother's day(10th May)

Subject- Business Studies (N. K. Sharma 7992259899)

1. Which is not a function of management of the following
(a) Planning (b) Staffing
(b) Cooperating (d) Controlling
2. Management is.....
(a) An art (b) A science
(b) Both art and science (d) Neither
3. The following is not an objective of the management
(a) Earning profit (b) Growth of the organization
(b) Providing employment (d) Policy making
4. Policy formulation is the function of
(a) Top level management (b) Middle level management
(b) Operational management (d) All level management
5. Coordination is
(a) function of management (b) the essence of management
(b) an object of management (d) none of the above
6. Name the three dimensions of management.
7. Why is management considered to be a group activity?
8. What is meant by co-ordination? State any four features.
9. State any five characteristics of co-ordination.
10. What is meant by 'efficiency' in management?
11. State any five functions of middle level management.
12. State any four functions of operational managers.
13. How does management help in increasing efficiency?
14. Rajan works as a production manager in a garment company. He has been given the target to produce 30,000 shirts per month at a cost of ₹400/- per shirt. He achieved this target at a cost ₹450/- per shirt. Do you think the manager is effective and efficient? Explain.

15. Seema works as an Interior Designer in a company. She has been asked to get 3,000 photo frames made in a week's time @ ₹300 per photo frame. She gets the work completed within 8 days @ ₹250/- per photo frame. Do you think Seema is effective and efficient in her work? Explain.

Subject - Economics (S. S. Suman 9934228288)

1. What is domestic territory of a country?
2. Define Normal resident of a country?
3. What is investment or capital formation?
4. Define Micro and Macro Economics?
5. What are the factors of production?
6. Define Net factor income from abroad (NFIA).
7. Who is the father of modern macro economics analysis?
8. When will NDP exceed NNP?
9. What should be deducted from GNP_{MP} to obtain GDP_{MP} ?
10. What is the difference between GNP_{FC} and GNP_{MP} ?
11. When will NNP_{MP} and NNP_{FC} be equal?
12. Give two differences between factor payment and transfer payment.
13. Explain any three precautions required to be taken in estimating national income by the value added method?
14. Explain briefly the steps taken in measuring national income through production method.
15. Calculate GNP_{MP} and GDP_{FC} from following data :-

National Income	895
Subsidy	50
Depreciation	65
Income to raw	15
Sale tax	10
Profit	15

16. Calculate National Income from the following data:-

	<u>Income</u>
Sales in Domestic Market	1025
Purchase of Raw material	50
Subsidy	10
Investment	85
Export	105
Income to Row	25
Current Replacement Cost	45
Service Tax	05

17. Calculate rules from the following data:-

	<u>Income</u>
Net addition to stock	95
National Income	1540
Consumption of fixed Capital	75
Import of raw material	85
NFIA	(-)65
Subsidy	90
Excise duty	55
Income from raw	25
Purchases of raw material	105

Subject- Accountancy (N. K. Sharma 7992259899)

1. Reya, Mona and Nisha shared profits in the ratio of 3:2:1. Profits for the last three years were ₹140000; ₹84000 and ₹106000 respectively. These profits were by mistake distributed equally. The error is now corrected. Give the necessary rectification Journal entry.
2. P and Q were partners in a firm sharing profits and losses equally. Their fixed capitals were ₹150000 and ₹300000 respectively. The Partnership Deed provided for interest on capital @ 12 % per annum. For the year ended 31st March, 2016 , profits of the firm were distributed without providing interest on capital.
Pass necessary adjustment entry to rectify the error.
3. Ram, Mohan and Sohan sharing profits and losses equally have capitals of ₹120000 , ₹90000 and ₹60000 respectively. For the year ended 31st March, 2020 interest was credit to them @ 6% p.a. instead of 5% p.a. Give adjustment Journal entry.
4. Profit earned by a partnership firm for the year ended 31st March, 2020 were distributed equally between the partners – Pankaj and Anu without charging interest on Drawings. Interest due on Drawings was Pankaj-- ₹3000 and Anu ₹1000.
Pass necessary adjustment entry.
5. X, Y and Z entered into partnership on 1st October, 2019 to share profits in the ratio of 4:3:3. X, personally granted that Z's share of profit after charging interest on capital @ 10% p.a. would not be less than ₹80000 in a year. Capital contributions were: X- ₹300000, Y- ₹200000 and Z ₹150000.
Profit for the year ended 31st March 2020 was ₹160000. Prepare Profit and Loss Appropriation Account.
6. A, B and C are partners in a firm. Their profit sharing ratio is 2:2:1. C is guaranteed a minimum of ₹ 100000 as share of profit every year. Any deficiency arising shall be met by B. The profits for the two years ended 31st March, 2019 and 2020 were ₹400000 and ₹600000 respectively.
Prepare Profit and Loss Appropriation Account for the two years.
7. A, B and C are partners in a firm sharing profits in the ratio of 3:2:1. They earned profit of ₹30000 during the year ended 31st March, 2020. Distribute profits among A, B and C if:
 - a. C's share of profit is guaranteed to be ₹6000 minimum.
 - b. Minimum profit payable to C amounting to ₹6000 is guaranteed by A.
 - c. Guaranteed minimum profit of ₹6000 payable to C is guaranteed by B.
 - d. Any deficiency after making payment of guaranteed ₹6000 will be borne by A and B in the ratio of 3:1.
8. Divya purchased Jyoti's business with effect from 1st April, 2020. Profits shown by Jyoti's business for the last three financial years ended 31st March, were:

2018	: ₹100000 (including an abnormal gain of ₹12500).
2019	: ₹125000 (after charging an abnormal loss of ₹25000).
2020	: ₹112500 (excluding ₹12500 as insurance premium on firm's property – now to be insured).

Calculate the value of firm's goodwill on the basis of two years' purchase of the average profit of the last three years.
9. Arun and Bharat are partners sharing profits in the ratio of 3:2. They decided to admit Manu as a partner from 1st April, 2020 on the following terms:
 - i) Manu will be given 2/5th share of the profit.
 - ii) Goodwill of the firm will be valued at two years' purchase of three years' normal average profit of the firm.Profits of the previous three years ended 31st March, were:

2020	: Profit ₹ 30000 (after debiting loss of stock by fire ₹40000).
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2019 : Loss ₹80000 (includes voluntary retirement compensation paid ₹50,000)
2018 : Profit ₹110000 (including a gain (profit) of ₹30000 on the sale of fixed assets).

Calculate the value of goodwill.

10. Raman and Daman are partners sharing profits in the ratio of 60:40 and for the last four years they have been getting annual salaries of ₹50000 and ₹ 40000 respectively. The annual accounts have shown the following net profit before charging partners' salaries.
Year ended 31st March 2018 - ₹140000, 2019- ₹101000 and 2020- ₹130000.
On 1st April 2020, Zeenu is admitted to the partnership for 1/4th share in profit (without any salary). Goodwill is to be valued at four years' purchase of weighted average profit of last three years (after partners' salaries);. Profits to be weighted as 1:2:3, the greatest weight being given to the last year. Calculate the value of Goodwill.
11. Gupta and Bose had a firm in which they had invested ₹50000. On an average, the profits were ₹16000. The normal rate of return in the industry is 15 %. Goodwill is to be valued at four years' purchase of profit in excess of profits @ 15% on the money invested. Calculate the value goodwill.
12. The total Capital of the firm of Sakshi, Mehak and Megha is ₹100000 and the market rate of interest is 15 % the net profits for the last three years were ₹30000, ₹36000 and ₹42000. Goodwill is to be valued at 2 years' purchase of the last 3 years' super profits. Calculate amount of goodwill if goodwill is valued at three years purchase of super profit.
13. Rakesh and Ashok earned profit of ₹5000. They employed capital of ₹25000 in the firm. It is expected that the normal rate of return is 15% of the capital. Calculate amount of goodwill if goodwill is valued at three years' purchase of super profit.
14. Average profit earned by a firm is ₹100000, which includes undervaluation of stock of ₹40000, on an average basis. The capital invested in the business is ₹630000 and the normal rate of return is 5% . Calculate goodwill of the firm on the basis of 5 times the super profit.
15. Raja Brothers earn an average profit of ₹30000 with a capital of ₹200000. The normal rate of return in the business is 10 %. Using capitalization of super profit method, workout the value of the goodwill of the firm.
16. Rajan and Rajani are partners in a firm. Their capitals were Rajan ₹300000, Rajani ₹200000. During the year ended 31st March,2020, the firm earned a profit of ₹150000. Calculate the value of goodwill of the firm by capitalization of super profit assuming that the normal rate of return is 20%.

Subject - Physics (Vijayant Sinha 7717789015)

1. Define the following terms :-
 - (a) Energy-band
 - (b) Type of semiconductor
 - (c) Effect of temperature on the conductivity of semi-conductor.
2. With the help of well labelled diagram, explain the working of rectifier and filter circuit.
3. Explain the working of Zener diode.
4. Explain Forward and Reverse characteristic of p-n junction.

Subject- Chemistry (C. B. Jha 9430451504)

1. Define the term solution. How many types of solutions are formed? Write briefly about each type with an example.
2. Give an example of a solid solution in which the solute is a gas
3. Define the following terms: (i) Mole fraction (ii) Molality (iii) Molarity (iv) Mass percentage.
4. Concentrated nitric acid used in laboratory work is 68% nitric acid by mass in aqueous solution. What should be the molarity of such a sample of the acid if the density of the solution is 1.504 g mL⁻¹?

5. 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 mL^{-1} , then what shall be the molarity of the solution?
6. How many mL of 0.1 M HCl are required to react completely with 1 g mixture of Na_2CO_3 and NaHCO_3 containing equimolar amounts of both?
7. A solution is obtained by mixing 300 g of 25% solution and 400 g of 40% solution by mass. Calculate the mass percentage of the resulting solution.
8. An antifreeze solution is prepared from 222.6 g of ethylene glycol ($\text{C}_2\text{H}_6\text{O}_2$) and 200 g of water. Calculate the molality of the solution. If the density of the solution is 1.072 g mL^{-1} , then what shall be the molarity of the solution?
9. A sample of drinking water was found to be severely contaminated with chloroform (CHCl_3) 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
10. What role does the molecular interaction play in a solution of alcohol and water?
11. Why do gases always tend to be less soluble in liquids as the temperature is raised?
12. State Henry's law and mention some important applications.
13. The partial pressure of ethane over a solution containing $6.56 \times 10^{-3} \text{ g}$ of ethane is 1 bar. If the solution contains $5.00 \times 10^{-2} \text{ g}$ of ethane, then what shall be the partial pressure of the gas?
14. What is meant by positive and negative deviations from Raoult's law and how is the sign of $\Delta_{\text{mix}}H$ related to positive and negative deviations from Raoult's law?
15. An aqueous solution of 2% non-volatile solute exerts a pressure of 1.004 bar at the normal boiling point of the solvent. What is the molar mass of the solute?
16. 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 g of octane?
17. The vapour pressure of water is 12.3 kPa at 300 K. Calculate vapour pressure of 1 molal solution of a non-volatile solute in it.
18. Calculate the mass of a non-volatile solute (molar mass 40 g mol^{-1}) which should be dissolved in 114 g octane to reduce its vapour pressure to 80%.
19. A solution containing 30 g of non-volatile solute exactly in 90 g of water has a vapour pressure of 2.8 kPa at 298 K. Further, 18 g of water is then added to the solution and the new vapour pressure becomes 2.9 kPa at 298 K. Calculate: (i) molar mass of the solute (ii) vapour pressure of water at 298 K
20. A 5% solution (by mass) of cane sugar in water has freezing point of 271K. Calculate the freezing point of 5% glucose in water if freezing point of pure water is 273.15 K.
21. Two elements A and B form compounds having formula AB_2 and AB_4 . When dissolved in 20 g of benzene (C_6H_6), 1 g of AB_2 lowers the freezing point by 2.3 K whereas 1.0 g of AB_4 lowers it by 1.3 K. The molar depression constant for benzene is $5.1 \text{ K kg mol}^{-1}$. Calculate atomic masses of A and B.

Subject- Biology (Rahul Jha 9631022032)

CHAPTER : Sexual Reproduction in Flowering Plants

1. What is the outermost and innermost wall layers of microsporangium in an anther called?
2. Why do we call embryo sac monosporic?
3. How many microspore mother cells will produce 1000 microspores?
4. Do pollen grains survive in adverse conditions.
5. Explain the role of tapetum in the function of pollen grain wall.

6. What is the disadvantage of self-pollination? List any two ways by which flowering plant discourage self-pollination.
7. Why are pollen grains produced in enormous quantity in maize?
8. Give the name of the parts of an angiosperm in which the development of male and female gametophyte takes place.
9. Arrange the following terms in a correct developmental gametophyte sequence. Pollen grain, sporogenesis tissue, microspore tetrad, pollen mother cell, male gametes.
10. Anthers of the angiosperm flowers are described as dehiscent. Give reason.
11. What are chasmogamous flowers? Can crosspollination occur in cleistogamous flowers? Give reason for your answer?
12. What is bagging technique? How is it useful in a plant breeding programme?
13. How will you distinguish between a complete and incomplete flower?
14. What is self-incompatibility? Why does self-pollination not lead to seed formation in self-incompatible species.
15. What is triple fusion? What is the product of this process? Where and how does it take place?
16. What is meant by emasculation? When and why does a plant breeder employ this technique.
17. What is microsporogenesis? Where does it occur in angiosperms?
18. With a neat labelled diagram, describe the parts of a typical angiosperm ovule.
19. Differentiate between male and female gametophyte.
20. Why is banana considered a good example of parthenocarpy?

Students are instructed to complete the assignment-2 carefully and submit it till 25 May, 2020 on the Whatsapp no. of your respective subject teachers. It is compulsory to attempt all questions. In case of any doubt, you can call the concerned subject teacher on the provided contact number. The marks obtained will be counted in your Internal Assessment. For any problem related to school app or downloading of assignment please contact :- 9470283176