

# HARI VIDYA BHAWAN

## WINTER VACATION ASSESSMENT

Class – XII

Session – 2022-23

Subject - Business Studies

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- Q1.** Explain “Management by exception” with respect to Analyzing deviations, a step in the process of controlling. Give a suitable example
- Q2.** Name the mechanism that attempts to measure certain characteristics of individuals in the process of identifying and choosing the best person out of the number of prospective candidates for the job. Enumerate any three of its types.
- Q3.** State any four barriers to communication which are concerned with problems and obstructions in the process of encoding and decoding the message into words or impressions.
- Q4.** Briefly explain any three of the following principles of management given by Henry Fayol:
- a. Unity of command
  - b. Equity
  - c. Remuneration
  - d. Initiative
- Q5.** Dheeraj wants to start a business of selling N-95 masks after the outbreak of the global pandemic of COVID-19. Due to the uncertain market conditions he wants to make a low investment in fixed capital. Suggest how the decisions related to the choice of technique and financing alternatives can help Dheeraj in ensuring a low investment in fixed capital requirements.
- Q6.** Ali Mohammad the CEO of Super Ltd believes that human resource is the most important asset of the firm. He believes that no organisation can be successful unless it can fill and keep filled the various positions provided for in the structure with the right kind of people. Identify the function of management being discussed above and state the benefits to the organisation that its proper application in the firm will ensure.
- Q7.** A public transport corporation has hired 2000 buses for the different routes for the passengers of metropolitan city. In order to fill vacancies, it advertised in the newspaper and number of applicants applied for the same. The company has to now undertake the process of selection to identify and select the best. Explain the first six steps involved in the process.
- Q8.** “Put simply, decentralization refers to delegation of authority throughout all the levels of the organization.” In the light of the above statement give the meaning of and difference between Delegation of authority and decentralization.
- Q9.** Kavita recently joined as the human resource director of Arjun Vidyamandir School, a senior secondary educational institute. She observed that the school had an experienced medical team on its payroll. They regularly offered useful suggestions which were neither appreciated nor rewarded by the school authorities. Instead the school outsourced the task of maintenance of health records of the students and paid them a good compensation for their services. Because of this, the existing medical team felt disheartened and stopped giving useful suggestions.
- a) Identify the communication barrier discussed above.
  - b) State the category of this communication barrier.
  - c) Explain any other two communication barriers of the same category.
- Q10.** State any four characteristics of good brand name.
- Q11.** What is meant by Capital Budgeting? State any four factors affecting fixed capital requirement of a firm.
- Q12.** The Research & Development department of Healthy Production Ltd. has decided to diversify from manufacturing health drinks to cereals made from millets. They are well aware of the fact that the company will have to communicate to the people the benefits of eating millets. For this purpose, they plan to sponsor various events like marathons and encourage people to switch to healthy eating through newsletters.
- a) Identify and briefly explain the promotional tool being discussed above.
  - b) Also explain any two other promotional tool that can be used by the company, apart from the one discussed above.
- Q13.** Explain the following rights of consumers provided by Consumer Protection Act, 2019:-
- (a) Right to Safety
  - (b) Right to Consumer Education
- Q14.** State any three objectives of the Securities Exchange Board of India

- Q15.** State any four factors affecting the financial decision that is concerned with raising of finance using shareholders' funds and borrowed funds.
- Q16.** 'Advertising' and 'Personal selling' both are communication tools used by the marketers to promote their products. Yet they differ in their approach. Differentiate between the two by giving any six points
- Q17.** Explain "Critical point control" with respect to Analyzing deviations, a step in the process of controlling. Give a suitable example.
- Q18.** "Planning is worth the huge costs involved?" Do you agree? Explain any four reasons in support of your answer.
- Q19.** Identity and explain the elements of directing mentioned below
- A. Astha, a manager, has the ability to influence others to bring about a change in their behaviour.
  - B. Neeraj, a managing director, declares share in the profits to the manager for their contribution to increase profits of the company.
- Q20.** "Controlling is an indispensable function of management. Without controlling the best of plans can go awry ". Do you agree? Explain any two reasons in support of your answer.

# HARI VIDYA BHAWAN

## WINTER VACATION ASSESSMENT

Class – XII

Session – 2022-23

Subject - Accountancy

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### ❖ Project File Topics

- Comprehensive Project
- Specific Project – I
- Specific Project – II
- Segment Analysis – I
- Segment Analysis – II

### ❖ Details of the Project Work (min 30-40 Transactions)

- Cover Page
- Name Page
- Certificate
- Acknowledgment
- Index
- Comprehensive Project
  - Company Details (4-5 Pages)
  - Transactions (30-40)
  - Preparation of Vouchers
  - Journal Entries
  - Ledgers
  - Trial Balance
  - Trading Account
  - Profit & Loss Account
  - Balance Sheet
- Specific Project – I/II
  - Company Details
  - Financial Statement
  - Ratio Analysis
  - Cash Flow Statement
  - Segment Comparison
- Conclusion
- Bibliography

# HARI VIDYA BHAWAN

## WINTER VACATION ASSESSMENT

Class – XII

Session – 2022-23

Subject - English

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### General Instructions

1. Follow the specific instructions given along with the questions.
2. All work should be neat and clean.

### Writing Section

#### Do the following questions in your fair notebook.

- Q1. You lost your wallet in the school playground. Write a notice for your school notice board giving all the necessary details.
- Q2. As Teacher Co-ordinator of the Quiz Club of AMM School, Pune, draft a notice in not more than 50 words informing students of the inter-class quiz contest asking them to register their names with the Secretary of the Club within a week .
- Q3. Water supply will be suspended for eight hours (10 am to 6 pm) on 6th of March for cleaning of the water tank. Write a notice in about 50 words advising the residents to store water for a day. You are Karan Kumar/Karuna Bajaj, Secretary, Janata Group Housing Society, Palam Vihar, Kurnool.
- Q4. You are Mahender, Sports Captain, St. John’s School, Lucicnow. Write a notice in 50 words for the school notice board informing students about an Inter School Football match to be played in your school. Invite them to watch and cheer the teams.
- Q5. You are Riya/Ryan living at 40, Krishna Colony, Manali. You decided to hold a lunch party to congratulate your grandparents on their golden wedding anniversary. Draft a formal invitation in not more than 50 words to all family members to attend a grand lunch at home.
- Q6. Draft a formal reply accepting an invitation to be present on the occasion of the wedding of Ankush S/o Mr & Mrs Shankar of 24, Green Park Road, Kanpur. You are Vikram Gaur of Raja Ki Mandi, Agra.
- Q7. The literary club of your society is putting up the play ‘Macbeth. As secretary of the club, draft an invitation inviting the famous writer Rohit Sharma to be the guest of honour at the function. Write the invitation in about 50 words. You are Gaurav/Garima.
- Q8. You have been invited as a judge for a debate competition by New Hope public School. Draft a formal refusal in about 50 words.
- Q9. Two main parks in your locality have suffered from neglect on the part of local authorities. They have virtually been taken over by undesirable elements. As a result the residents have stopped going to the parks. Write a letter in 120-150 words to the editor of a local newspaper expressing your concern about the problems the neglect has created and suggest measures to reclaim the parks for children. You are Gautam/ Gauri of 2, Gobind Enclave, Meerut.
- Q10. You are Anand/Arti of 14, Model Town, Delhi. You have seen an advertisement in The Hindu for the post of Chief Chef in a 5-Star Hotel. Apply for the job with complete bio-data. Write in 120-150 words.
- Q11. Write a letter to Editor of local daily, New Delhi about water scarcity in you locality suggesting ways to improve the condition of water supply. You are Bobby/Babita of Ghaziabad.
- Q12. As a regular commuter by bus from Noida to Delhi, you have been witnessing rash driving by the bus drivers daily without an exception. Write a letter to the Editor, ‘The Times of India’ drawing the attention of

the General Manager, Delhi Transport Corporation to this problem. You are Priti/Prakash, 15, Udyog Vihar, Noida.

Q13. You are Jay/Jaya, studying in Shyamala Memorial Hall, Trichy. Some students of our school attend a first aid training camp for a week at Red Cross Headquarter of our state. Write a report for your school magazine in 100-125 words on the events of the camp and your participation and performance.

Q14. Visiting new places and meeting new people enhance our understanding and knowledge besides being a source of great pleasure. Write an article in 120-150 words on 'Travel, a Source of Knowledge and Pleasure'. You are Gopal/Govindi.

Q15. Incessant rain has caused irrecoverable damage in your area. As an active participant in the flood relief programme, write a report in 125-150 words on the different flood relief measures carried out. You are Krishan/ Krishna.

Q16. Accidents happen when people violate traffic rules. Careless drivers cause suffering to themselves and to others. Write an article in 120-150 words on "Safe Driving".

### **Literature Section**

**Do the following questions in your fair notebook.**

**Answer the following questions in about 40-50 words each.**

Q17. Franz reached school late. Yet, M. Hamel did not scold him. Why?

Q18. Describe the crofter's hospitality towards the peddler.

Q19. Explain Douglas's statement, "The instructor was finished. But I was not finished."

Q20. What do celebrities dislike most about interviews?

Q21. What makes human beings love life in spite of all the troubles they face?

Q22. How does the poet describe Aunt Jennifer's tigers?

Q23. Is the society in any way affected by Aunt Jennifer's death?

Q24. Why did Gandhiji feel that it was useless for the peasants to go to law courts?

Q25. For Franz, what was much more tempting than going to school and why?

Q26. What different image does the poet use to convey the idea of her mother's age?

Q27. Why did the peddler sign himself as Captain von Stahle?

Q28. How can suspension of activities help? (Keeping Quiet)

Q29. Dr Sadao was a calm person in general. What made him raise his voice at Hana? How did she react?

Q30. What did Derry's mother think of Mr. Lamb?

Q31. Why did Charley run away from the third level?

Q32. How did the gardener react when Dr. Sadao told him about the wounded American soldier?

Q33. If you were to give a different ending to the story, "On The Face of It" how would you end it?

Q34. What is common between Zitkala-Sa and Bama?

**Answer the following questions in about 120-150 words each.**

Q35. Why should child labour be eliminated and how? Explain on the basis of Lost Spring.

Q36. Elaborate how the Champaran episode is considered as the turning point in Gandhi ji's life.

Q37. The actual pain or inconvenience caused by a physical impairment is often much less than the sense of alienation felt by the person with disabilities. What is the kind of behaviour that the person expects from others?

Q38. How did the Tiger King manage to retain his kingdom?

Q39. Why is the Champaran episode considered to be the beginning of the Indian struggle for independence?

Q40. How did the peddler betray the confidence reposed in him by the crofter in "The Rattrap"?

Q41. What benefits did Derry reap from his association with Mr. Lamb?

Q42. Describe the difficulties faced by Dr. Sadao when he decided to help the enemy soldier.

# HARI VIDYA BHAWAN

## WINTER VACATION ASSESSMENT

Class – XII

Session – 2022-23

Subject - History

### Multiple Choice Questions:-

- Which metal coins came in use in the 6<sup>th</sup> century as an experiment?
  - Silver and copper
  - Copper and Gold
  - Gold and Silver
  - None of these
- Sufism is the coined word of the 19<sup>th</sup> century of:
  - Arabic
  - Persian
  - English
  - Urdu
- Which of the following statements is the correct explanation of 'Endogamy'?
  - Marriage outside a kin group.
  - Marriage within a kin group.
  - A woman having several husbands.
  - A man having several wives.
- Who was the Court historian of Akbar?
  - Abul Fazl
  - Al-Biruni
  - Abdur Razzaq
  - Salim Javed
- Which of these rivers was the major source of water for Vijayanagara?
  - Kaveri
  - Krishna
  - Tungabhadra
  - Mahanadi
- Which among the following is Correctly matched?

List I	List II
A. It means great wheel	1. Vaishnavism
B. It means lesser Wheel	2. Hinayana
C. It is a religious town near Bhopal	3. Mahayana
D. It is a form of Hinduism	4. Sanchi

Codes

A	B	C	D
a) 1 3 4 2			
b) 3 2 4 1			
c) 3 2 1 4			
d) 4 1 3 2			
- Find out from the following pairs which one is not correctly matched.
  - Bells of arms – store room of weapons
  - Firangi – An Arabic Origin

- c) Mutiny – a collective disobedience
  - d) Revolt – a rebellion of people against authority
8. Who presented objective Resolution in front of Constituent Assembly?
- a) Mahatma Gandhi
  - b) Dr. B.R Ambedkar
  - c) Pt.Jawarhar Lal Nehru
  - d) Sardar vallabh patel
9. Who said, “Separate Electorate will be suicidal to minorities and will do them tremendous harm”?
- a) Mahatma Gandhi
  - b) Govind Ballabh Pant
  - c) Pandit Nehru
  - d) B.Pokar Bahadur
10. Which of the following options is correct? Gandhiji participated in which session?
- a) First round table conference
  - b) Second round table conference
  - c) Third round table conference
  - d) All of the above
11. Find out from the following trains which one is not correctly matched.
- a) Lord welllesely-CalcuttaAlipore Zoo
  - b) Charles Cornwallis- Permanent settlement
  - c) Santhal-Santhal Paragana
  - d) Discuss- Zamindars
12. Historians of religion classify bhakti traditions into two broad categories \_\_\_ and \_\_\_\_
- A. Sagun and Vigun
  - B. Sagun and Nirgun
  - C. Nirgun and Sarvagun
  - D. None of the above
13. Which of the following category of society of ancient Persia was not recognised by the Al- Biruni?
- A. Knights and princes
  - B. Monks and fir- priests
  - C. Peasants and artisans
  - D. Children and women

### **Short Answers Type Questions:-**

1. Give reason why the 6<sup>th</sup> century BCE is often regarded as a major turning point in early Indian history.
2. Discuss the extent to which religious beliefs shaped the events of 1857.
3. How has Al- Biruni described the Caste system?
4. Explain the main principles of Ashoka’s dhamma.
5. “Krishnadeva Raya was characterized by expansion and consolidation.” Justify the statement on the basis of evidence.
6. Describe the teachings of the Buddha.
7. How did zamindars manage to retain control over their zamindaris?
8. Explain the architecture of Vijayanagar.
9. Explain the main principles of Ashoka’s dhamma.
10. Examine why the religious division between Hindus and Muslim were hardly noticeable during the uprising of 1857.

### **Long Answers Type Questions:-**

1. Describe the Mahabharat as a dynamic text.
2. “Quit India Movement was genuinely a mass movement.” Justify the statement with arguments.
3. What were the three factors that led to the expansion of agriculture during the 16<sup>th</sup> and 17<sup>th</sup> centuries?
4. Explain the significance of the Non – Cooperation Movement of 1920.
5. Describe the contributions of John Marshall, Director General of the ASI to Indian archaeology.
6. How did Mahatma Gandhi express his view in Banaras Hindu University?

7. Explain the main features of the Mauryan administration.
8. Identify the relationship between the Sufis and the state from the 8<sup>th</sup> to 18<sup>th</sup> century.
9. Why did new religious sects emerged during sixth century BCE?  
Explain the system of land grants and trade from 600 BCE to 600 CE.

# HARI VIDYA BHAWAN

## WINTER VACATION ASSESSMENT

Class – XII

Session – 2022-23

Subject – Political Science

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### Multiple Choice Questions:-

1. The impact of Emergency was felt most strongly in the \_\_\_\_ party of the country.
  - a) Eastern
  - b) Northern
  - c) Southern
  - d) Wester
2. The political development after the 1990's reveal the emergence of \_\_\_\_\_.
  - a) Congress dominance
  - b) Coalition government
  - c) Consolidation of BJP
  - d) Emergence of regional politics
- 3 .The countries which used WTO to advance its own interest are \_\_\_\_\_.
  - a) USA
  - b) European Union
  - c) Japan
  - d) All of these
4. Secessionist demands on account of tribal identity arose in which of the following states?
  - a) Jharkhand
  - b) Nagaland/Mizoram
  - c) Punjab
  - d) Tamil Nadu
5. The impact of Emergency was felt most strongly in the \_\_\_\_ party of the country.
  - e) Eastern
  - f) Northern
  - g) Southern
  - h) Western
6. Health epidemics are spread through \_\_\_\_\_ across the continents.
  - a) Migration
  - b) Business and tourism
  - c) Military operation
  - d) All of the above
7. The countries which used WTO to advance its own interest are \_\_\_\_\_.
  - e) USA
  - f) European Union
  - g) Japan
  - h) All of these
8. Arrange the following terrorist attacks in sequence..
  - (i) Chemical Weapon Convention
  - (ii) Non – Proliferation Treaty
  - (iii) Biological Weapons Convention
  - (iv) Strategic Arms Reduction Treaty

Choose the correct option.

- a) iii,iv,ii,is
- b) ii,iv,iii,i
- c) ii,iv,i,iii
- d) ii,iii,iv,i

9. Name the Soviet leader who faced a coup in the year 1991.

- A. Boris Yelstin
- B. Mikhail Gorbachev
- C. Leonid Brezhnev
- D. Joseph Stalin

10. Name the party that dominates the Political affairs of Maldives.

- A. Maldivian Dictatorship Party
- B. Maldivian Democratic party
- C. Maldivian People's Party
- D. Maldivian Majority Party

### **Very Short Answers Type Questions:-**

1. When and by whom PRI was founded?
2. What is the significance of Article 370?
3. Explain any four objectives of Non –Aligned Movement.
4. When was the Communist Party emerged?
5. List three challenges to democracy in Nepal.
6. What is the difference between a Coalition party and Coalition in congress system?
7. Mention problem created by protectionism
8. What are the odds which limit the ability of EU?

### **Short Answers Type Questions:-**

1. What happened to the state government?
2. Why did the Soviet System become so weak and Soviet economy stagnated?
3. Describe briefly any four problems faced in the process of partition of India.
4. Mention any four functions performed by UNICEF.
5. What do you mean by Arab Spring? Mention any four causes of Arab Spring.
6. Indian politics after the Emergency was characterised by some major developments. Describe any two of them.
7. Discuss the importance of SAARC?
8. What is International Labour Organisation? Mention its Objectives.
9. State the democratic transition in Nepal.
10. What are the non – traditional notions to security?

### **Long Answers Type Questions:-**

1. State the objectives of NITI Aayog.
2. Critically evaluate the impact of the changing role of state in the developing countries in the light of globalisation?
3. What reasons did the government give for declaring a National Emergency in 1975?
4. Mention any four Directive Principles of State Policy for the promotion of International peace and security.
5. “Emergency was a Blackmark in Indian History”? Comment.
6. What do you know about land reforms in India during planning period?
7. Discuss National Development Council and its objectives in detail.
8. Describe any six criteria for the new membership of the Security Council as suggested after 1997.
9. Analyze the composition of the United Nations Security Council. What according to your opinion is the major difference in the privileges given to its permanent and nonpermanent members?
10. What were the reasons which led to the mid-term elections in 1980?

# HARI VIDYA BHAWAN

## WINTER VACATION ASSESSMENT

Class – XII

Session – 2022-23

Subject – Economics

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### **General Instructions:**

- Do the given questions in your revision notebook.
- The given questions are long answer type questions and is to be answered in 100 to 150 words.
- Revise whole syllabus for pre-board examination.
- Make necessary corrections in your practical files.
- Do preparation of viva from the content written in the respective files.

### **Questions:**

Q-1. Distinguish between balance of trade and current account balance of payments.

Q-2. Distinguish between Central Bank and commercial banks.

Q-3. Explain any three objectives of government budget.

Q-4. Explain the relationship between investment multiplier and marginal propensity to consume.

Q-5. How fixed exchange rate is determined?

Q-6. Discuss the credit needs of the farmers.

Q-7. Explain the characteristics of small scale industries.

Q-8. Why are regular salary employees more in urban areas than in rural areas.

Q-9. Write components of institutional reforms in Indian agriculture.

Q-10. Distress sale of the small and marginal holders points to deficiency of market infrastructure in India.  
Comment.

### **Following are the topics for project file.**

**(No need to make new one just make necessary corrections and check your topics)**

<b>Roll. No</b>	<b>Topic</b>
1-5	Employment situation in India
6-10	Balance of Payments
11-15	Self Help groups
16-20	Digital India- step towards future
21-25	Micro and small scale industries
26-30	Government Budget and it's components
31-35	Indian agriculture
36-40	Role of Central Bank
41-45	Make in India- The way ahead
46-50	COVID-19
51-55	Organic farming- Back to the Nature

# HARI VIDYA BHAWAN

## WINTER VACATION ASSESSMENT

Class – XII

Session – 2022-23

Subject – Front Office Operation

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### **General Instructions:**

- Do the given questions in your revision notebook.
- The given questions are long answer type questions and is to be answered in 100 to 150 words.
- Revise whole syllabus for pre-board examination.
- Make necessary corrections in your practical files.
- Do preparation of viva from the content written in the respective files.

### **Questions:**

Q.1. Who is the head of the security department of a hotel? List any two important goals of hotel security department.

Q.2. List any four characteristics of eco tourism.

Q.3. Discuss the points to be kept in mind while positioning of front office desk in hotel?

Q.4. Elaborate the of reservations from a hotel perspective.

Q.5. what is the other term used for green hotels? Convince the hoteliers to participate in the green practices by telling them its 5 benefits.

Q.6. Discuss the two basic types of Central reservation system followed in hotels.

Q.7. Explain whitney system of reservation and mention its four advantages.

Q.8. Electronic guest room locks have greater flexibility compared to manual systems. Discuss the various advantages of using electronic keys in hotel?

Q.9. Explain the various ways in which a hotel can control its boundary and grounds.

Q.10. Front office management and staff should follow resolution guidelines when handling guest complaints. Elaborate.

### **Following are the topics for project file.**

**(No need to make new one just make necessary corrections and check your topics)**

<b>Roll. No</b>	<b>Topic</b>
<b><u>For 12<sup>th</sup> A</u></b>	
1-7	Hotel Organization
8-14	Hospitality Industry
15-21	Service Related Problem
22-27	Hotel Safety and Security
28-33	Creative Problem Solving and Situation Handling
<b><u>For 12<sup>th</sup> B</u></b>	
1-8	Etiquettes and Manners
9-16	Organization of front office department
17-24	History and Evolution in hospitality industry
25-32	Responsible Hotels
33-40	Hotel Management
41-48	Five hotels with logos, foundation and timelines
49-55	Attributes required for a good hospitality professional

# HARI VIDYA BHAWAN

## WINTER VACATION ASSESSMENT

Class – XII

Session – 2022-23

Subject – Mathematics

### General Instructions:

- Do the given questions in your revision notebook.
- Revise whole syllabus for pre-board examination.
- Make necessary corrections in your practical files.
- Do preparation of viva from the content written in the respective files.

Q.1. Prove that the function  $f$  is surjective, where  $f: N \rightarrow N$  such that

$$f(n) = \begin{cases} \frac{n+1}{2}, & \text{if } n \text{ is odd} \\ \frac{n}{2}, & \text{if } n \text{ is even} \end{cases}$$

Is the function injective? Justify your answer.

Q2. A man 1.6 m tall walks at the rate of 0.3 m/sec away from a street light that is 4 m above the ground. At what rate is the tip of his shadow moving? At what rate is his shadow lengthening?

Q3. If  $a\vec{i} = \hat{i} - \hat{j} + 7\hat{k}$  and  $b\vec{i} = 5\hat{i} - \hat{j} + \lambda\hat{k}$ , then find the value of  $\lambda$  so that the vectors  $a\vec{i} + b\vec{i}$  and  $a\vec{i} - b\vec{i}$  are orthogonal.

Q.4. Find the direction ratio and direction cosines of a line parallel to the line whose equations are

$$6x - 12 = 3y + 9 = 2z - 2$$

Q5. If  $y\sqrt{1-x^2} + x\sqrt{1-y^2} = 1$ , then prove that  $\frac{dy}{dx} = -\sqrt{\frac{1-y^2}{1-x^2}}$

Q6. Find  $|\vec{x}|$  if  $(\vec{x} - \vec{a}) \cdot (\vec{x} + \vec{a}) = 12$ , where  $\vec{a}$  is a unit vector.

Q7. Find:  $\int \frac{dx}{\sqrt{3-2x-x^2}}$

Q8. Three friends go for coffee. They decide who will pay the bill, by each tossing a coin and then letting the "odd person" pay. There is no odd person if all three tosses produce the same result. If there is no odd person in the first round, they make a second round of tosses and they continue to do so until there is an odd person. What is the probability that exactly three rounds of tosses are made?

Q 9. Find the mean number of defective items in a sample of two items drawn one-by-one without replacement from an urn containing 6 items, which include 2 defective items. Assume that the items are identical in shape and size.

Q10. Evaluate:  $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{\tan x}}$

Q.11 Evaluate:  $\int |x-1| dx$

Q12. Solve the differential equation:  $ydx + (x-y)dy = 0$

Q.13. Solve the differential equation:  $xdy - ydx = \sqrt{x} + y dx$

Q.14. Solve the following Linear Programming Problem graphically:

Maximize  $Z = 400x + 300y$  subject to  $x + y \leq 200, x \leq 40, x \geq 20, y \geq 0$

Q.15. Make a rough sketch of the region  $\{(x, y): 0 \leq y \leq x, 0 \leq y \leq x, 0 \leq x \leq 2\}$  and find the area of the region using integration.

Q.16. Define the relation R in the set  $N \times N$  as follows:

For  $(a, b), (c, d) \in N \times N, (a, b) R (c, d)$  iff  $ad = bc$ . Prove that R is an equivalence relation in  $N \times N$

Given a non-empty set X, define the relation R in  $P(X)$  as follows:

For  $A, B \in P(X), (A, B) \in R$  iff  $A \subset B$ . Prove that R is reflexive, transitive and not symmetric.

Q.17. An insect is crawling along the line  $\vec{r} = 6\hat{i} + 2\hat{j} + 2\hat{k} + \lambda \hat{i} - 2\hat{j} + 2\hat{k}$  and another insect is crawling along the line  $\vec{r} = -4\hat{i} - \hat{k} + \mu 3\hat{i} - 2\hat{j} - 2\hat{k}$ . At what points on the lines should they reach so that the distance between them is the shortest? Find the shortest possible distance between them.

Q.18. The equations of motion of a rocket are:

$x = 2t, y = -4t, z = 4t$ , where the time t is given in seconds, and the coordinates of a moving point in km. What is the path of the rocket? At what distances will the rocket be from the starting point  $O(0, 0, 0)$  and from the following line in 10 seconds?  $\vec{r} = 20\hat{i} - 10\hat{j} + 40\hat{k} + \mu(10\hat{i} - 20\hat{j} + 10\hat{k})$

Q.19. If  $A = \begin{pmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{pmatrix}$ , find  $A^{-1}$ . Use  $A^{-1}$  to solve the following system of equations

$$2x - 3y + 5z = 11, 3x + 2y - 4z = -5, x + y - 2z = -3$$

Q.20. Case-Study 1: Read the following passage and answer the questions given below.



The temperature of a person during an intestinal illness is given by

$f(x) = -0.1x + mx + 98.6, 0 \leq x \leq 12$ , m being a constant, where f(x) is the temperature in °F at x days.

- (i) Is the function differentiable in the interval (0, 12)? Justify your answer.
- (ii) If 6 is the critical point of the function, then find the value of the constant m.
- (iii) Find the intervals in which the function is strictly increasing/strictly decreasing.
- (iii) Find the points of local maximum/local minimum, if any, in the interval (0, 12) as well as the points of absolute maximum/absolute minimum in the interval [0, 12]. Also, find the corresponding local maximum/local minimum and the absolute maximum/absolute minimum values of the function.

Q.21. Case-Study 2: Read the following passage and answer the questions given below.



In an elliptical sport field the authority wants to design a rectangular soccer field with the maximum possible area. The sport field is given by the graph of

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

- (i) If the length and the breadth of the rectangular field be  $2x$  and  $2y$  respectively, then find the area function in terms of  $x$ .
- (ii) Find the critical point of the function.
- (iii) Use First derivative Test to find the length  $2x$  and width  $2y$  of the soccer field (in terms of  $a$  and  $b$ ) that maximize its area.
- (iii) Use Second Derivative Test to find the length  $2x$  and width  $2y$  of the soccer field (in terms of  $a$  and  $b$ ) that maximize its area.

# **HARI VIDYA BHAWAN**

## **WINTER VACATION ASSESSMENT**

**Class – XII**

**Session – 2022-23**

**Subject – Physical Education**

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### **❖ Details of the Project Work (min 30-40 Pages)**

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