Class/Sec: [blank]   Roll No. : [blank]

DELHI PUBLIC SCHOOL

SAIL TOWNSHIP, RANCHI

HALF YEARLY EXAMINATION (2017-18)

Class:-XII   **Subject:- Mathematics**
Time- 3 Hrs.   **M.M-100**

General Instructions:-

1. *All questions are compulsory.*
2. *Please check that this question paper contains 29 questions.*
3. *Please write down the Serial Number of the question before attempting it.*
4. *15 Minutes time has been allotted to read this question paper. The student will read the question paper only and will not write any answer on the answer book during this period.*
5. *The question paper consists of 29 questions divided into four sections A,B,C and D.*
    Section A → Q. No. - 1 to 4 → 1 mark each.
    Section B → Q. No. - 5 to 12 → 2 marks each.
    Section C → Q. No. - 13 to 23 → 4 marks each.
    Section D → Q. No. - 24 to 29 → 6 mark each.
6. *All questions in section A are to be answered in one word, one sentence or as per the exact requirement of the question.*
7. *There is no overall choice. However , internal choice has been provided in 3 questions of four marks each and 3 questions of six marks each. You have to attempt only one of the alternatives in all such questions.*

Section –A   [1x4=4]

1. Let * be a binary operation on the set R of all real numbers defined by a*b = 2a+b.

    Find (2*3) *4.

2. Find the principal value of sec $^{-1}$ ($-\sqrt{2}$).

3. Find all possible orders of matrices having 7 elements.

4. Find $\int_{-\pi/2}^{\pi/2} sin^7 x \, dx$.

Section –B   [2x8=16]

5. For the binary operation * defined on R-{1} by the rule a*b = a+b+ab for all a,b $\in$R−{1}. Find the inverse of a.

6. Determine whether binary operation * is associative on Z^+ defined as a*b = a^b .

7. Evaluate : $\tan \left[\frac{1}{2} cos^{-1} \left(\frac{\sqrt{5}}{3}\right)\right]$.

8. Find the inverse of the matrix $\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$.

9. If y= tan^{-1} x , find $\frac{d^2 y}{dx^2}$ in terms of y.

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10. The volume of a cube increases at constant rate. Prove that the increase in its surface area varies inversely as the length of the side.

11. Find: $\int \dfrac{\sin x}{\sin (x-\alpha)}\,dx$.

12. Evaluate: $\int_0^{\pi/4}(tanx - x)\,tan^2x\,dx$.

<u>Section –C</u>   [4x11=44]

13. Show that the function f:R $\longrightarrow$ { x∈R : − 1 <x < 1 } defined by $f(x) = \dfrac{x}{1+|x|}$, x ∈ R is one-one and onto function.

14. Prove that $\tan\left\{\dfrac{\pi}{4} + \dfrac{1}{2}\,cos^{-1}\dfrac{a}{b}\right\} + \tan\left\{\dfrac{\pi}{4} - \dfrac{1}{2}\,cos^{-1}\dfrac{a}{b}\right\} = \dfrac{2b}{a}$.

15. Let A = $\begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$ then show that A² – 4A+ 7I = 0. Using the result calculate A⁵ also.

16. Express the matrix B= $\begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$ as the sum of a symmetric and a skew symmetric matrix.

17. Show that the determinant Δ = $\begin{vmatrix} 3 & -2 & sin\,3\theta \\ -7 & 8 & cos\,2\theta \\ -11 & 14 & 2 \end{vmatrix}$ = 0,   when sin θ = 0 or ½ .

OR

Prove that $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix}$ = abc $\left(1 + \dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{c}\right)$ = ab+ bc+ ca+ abc.

18. (a) Show that the function f(x) = |x − 3| is continuous.

    (b) If f(x+y) = f(x). f(y) . ∀ x and y and if f (5) = 2 and f′(0) = 3 , find f′ (5).

19. If f(x) = cos x. cos 2x . cos 4x. cos 8x. cos 16x , then find f′ $\left(\dfrac{\pi}{4}\right)$.

OR

If xᵐ . yⁿ = (x+y)ᵐ⁺ⁿ .   Prove that $\dfrac{d^2\,y}{dx^2}$ = 0.

20. Determine the values of x for which the function f(x) = xˣ , x>0 is increasing or decreasing.

21. Find $\int sin^{-1}\sqrt{\dfrac{x}{a+x}}\,dx$.

22. Evaluate :- $\dfrac{5050\int_0^1(1-x^{50})^{100}\,dx}{\int_0^1(1-x^{50})^{101}\,dx}$.

23. Evaluate :- $\int_0^3 (x^2 + 2)\ dx$ from the first principle.

OR

Using integration , find the area of the region bounded by the following curves:-

y= 1+ $|x + 1|$, x = -2 ,   x = 3 and y = 0

Section –D [6x6=36]

24. If R and R′ are two equivalence relations in a set A, show that
   (a) R ∩ R′ is an equivalence relations in A.
   (a) R ∪ R′ is not an equivalence relations in A.

OR

Let f:N → R be a function defined as f(x) = 4x² + 12x +15. Show that f:N → Range (f) is invertible. Find the inverse of f.

25. If A = $\begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$, find A⁻¹ .

   using A⁻¹ , solve the following system of equations: -
   2x – 3y + 5z = 11 , 3x+2y – 4z = −5 , x+y −2z = −3

26. (a) if y = log $\dfrac{\sqrt{x^2 + a^2} + x}{\sqrt{x^2 + a^2} - x}$, prove that $\dfrac{d\,y}{dx} = \dfrac{2}{\sqrt{x^2 + a^2}}$.

   (b) If $y^x = e^{y-x}$, prove that $\dfrac{d\,y}{dx} = \dfrac{(1+log y)^2}{log\ y}$.

27. Using Mean – value theorem, prove that
   (i) sin x<x for x>0
   (ii) tan x > x ∀ x ϵ $\left(0, \dfrac{\pi}{2} \right)$.
   Write the impact of limitation and continuity in a human life.

28. Find the equations of tangent and normal to the curve 16 x² + 9 y² = 14 4 at (x_1, y_1) where x_1 = 2 and $y_1 > 0$.

OR

A right circular cylinder is inscribed in a cone. Show that the curved surface area of the cylinder is maximum when the radius of the cylinder is equal to half of the radius of the base of the cone.

29. Find : $\int \dfrac{dx}{\sin 2\ x - \sin x}$.

OR

Find : $\int \dfrac{dx}{(x^2+1)\sqrt{x}}$.

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Class:-XII   Subject:- Entrepreneurship
Time- 3 Hrs.   M.M-70

General Instructions:-

1. *All the questions are compulsory.*
2. *Marks are indicated against each question.*
3. *Questions No.- 1 to 5 are very short answer type questions carrying 1 mark each. Answers to each of these should not exceed 15 words.*
4. *Questions No. 6 to 10 are short answer type questions carrying 2 marks each. Answers to each of these should not exceed 50 words.*
5. *Questions No. 11 to 17 are short answer type questions carrying 3 marks each. Answers to each of these should not exceed 75 words.*
6. *Questions No. 18 to 21 are short answer type questions, carrying 4 marks each. Answers to each of these should not exceed 150 words.*
7. *Questions No. 22 to 24 are long answer type questions , carrying 6 marks each. Answers to each of these should not 250 words.*

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1. How do entrepreneurs spot opportunities?   [1]

2. What is meant by 'mutual agency of partners'?   [1]

3. List the forms of 'synergy', as one of the reasons of mergers and acquisitions.   [1]

4. 'Pure Neer India Ltd, ' is the manufactures of water purifiers. The company has developed a new water purifier that not only converts the hard water into soft water but also kills the bacteria and other harmful micro organisms present in it. The company has named this water purifier as 'Nirmal Neer' and for its marketing , appointed salesmen throughout the country. The company also trained the the salesmen to provide information about the usefulness of the 'Nirmal Neer' water purifiers to the customers and motivate them to buy the same.   [1]

    Name the promotion strategy adopted by the company and also identify the channel of distribution used by the company.

5. What do you mean by conglomerate merger? Give one example of the same.   [1]

6. Hema enterprises is dealing in Health drinks. The enterprise has been manufacturing 'Mother's choice' a malt based health drink. Adopting to the latest trends she decided to bring out an improved form of fortified health drink with vitamin B-12 , iron and minerals to increase immunity. She believed that by modifying the product she will be able to create a new product. Identify the concept and define it.   [2]

7. List the types of acquisition. [2]

8. 'Tata' manufactured a Motor Car 'Nano' for a common man which is very low in price. Name and explain the behavioural characteristic that develops the idea of 'Tata' into available and successful project. [2]

9. Sanjiv was developing a business plan for his organization. While working on the financial plan he realized that his financial requirements will be for fixed assets and their installations, preliminary expenses, working capital , expenses, or research development and investment in short term assets i.e, raw material, level of cash etc. To decide on the sources of funds for the venture , he tried to ensure the selection of the best overall mix of financing for the enterprise.
   (a) Identify the elements of financial plan discussed here.
   (b) Why is it important for an entrepreneur to ensure the selection of the best overall mix of financing for the enterprise? [2]

10. Explain any two factors which lead to effective employee relationship. [2]

11. Sonu and Monu completed their education from Delhi University. Sonu lived near the university , whereas Monu had to go back to his village in Assam. Both of them wanted to start their own business . Since the government announced ban on the use of polythene bags , an idea struck them to start a Jute bag manufacturing business. Sonu thought he would get the advantage of university area for marketing the Jute bags and will earn good profits. He also had necessary funds. Therefore he started manufacturing the bags immediately. He was not having any experience of manufacturing Jute bags. He also sold the bags on less margin due to tough competition. As a result his business failed after few years. On the otherhands Monu was happy because the raw material was available to him at a very low cost in Assam and people of the village were ready to work at low wages because of less job opportunities. Not only this, before starting the business Monu had researched about the cost –structure , the market , the competitors and the strength and weaknesses of the business.

   Based on the above paragraph identify and explain any two causes of failure of Sonu's business in comparison to Monu. Also identify any two values which Monu had communicated to the society through his business. [3]

12. Slurrpy is a new mixed fruit Juice introduced by Amit Beverages Ltd. The mixed fruit juice has been fortified using various vitamins and minerals. The company designed a unique package for the product which made is very attractive. Their sales figures were an indication of their success. [3]
   In order to capture huge market share, they decided to give exclusive rights to retailers to manufacture and sell the product to the public.
   (a) Identify and explain the concept followed in the above mentioned paragraph.
   (b) State any two advantages / Benefits to startups that are extended by Amit Beverages Ltd.

13. What do you mean by value chain? Draw a flow chart for the same. **[3]**

14. Enumerate any six problems faced by first generation entrepreneurs. **[3]**

15. Name and define the form of business organization in which liability of its members is limited. Explain any two features of the same. **[3]**

16. What are the components of 'Brand'? Explain them with suitable examples. **[3]**

17. Lalit a small entrepreneur is manufacturing portable fans with the brand name 'P. FAN'.

    These fans are in great demand . He finds that the cost of production per unit of the fan is Rs. 800 and he can sell the same at Rs. 1000 per fan. The competitors in the market are selling this type of fan at the rate of Rs. 1200. Lalit's objective is not to earn profit in the short-run but to capture the largest market share. His expectation is that the customers will be attracted towards the new brand because of lower price.
    Identify the method of pricing adopted by Lalit to capture the substantial portion of the market. Also state any two advantages of this method of pricing. **[3]**

18. " Information for environmental scanning can be collected from several sources". State any four such sources. **[4]**

19. Aman an IITian wanted to start his own business with an initial investment of Rs. 25 lakshs which his father has agreed to lend him. But he is not sure of what business he has to undertake , where to locate his business etc. Suggest him the basic factors to be considered before starting a business. Explain any four such factors. **[4]**

20. Differentiate between ATL and BTL. **[4]**

21. Raman started a Gym named as 'Strong Body' . He installed large number of machines and equipments of different types and appointed qualified trainers to help the customers in the use of machines. Initially he kept a low fees per hour so that boys and girls belonging to the poor families may also avail the facilities of the Gym. Very soon his Gym became popular and he started operating in there shifts. For this he appointed additional trainers. He also installed extra machines so that more customers could be enrolled. In one year he started earning good profit. He took a nearby building on rent and started a 'Recreation and Health Club' for senior citizens of the locality on very nominal charges. He also encouraged young boys and girls to participate in the cleanliness drive started by the Prime Minister. They agreed and started giving one hour daily for cleanliness of the nearby areas before opening of the 'Strong body' Gym and 'recreation club'.
    (a) Identify and explain the type of business expansion that took place under the entrepreneurship of Raman.
    (b) Identify any two values that Raman tried to propagate. **[4]**

22. Kavita has observed that there can be a good market for hand-knitted cotton and woolen trendy garments for small kids up to the age of three years. She thought of starting a small enterprise for the same. She also ensured that the enterprise will require 10-15 trained workers and an investment of rupees two lakhs. This will give 40 % annual return on investment.
   (a) Quoting the lines from the above para, identify and give the meaning of the entrepreneurship concept being stated in the above para.
   (b) Also, state the elements of the concept identified in (a) above. [6]

23. It's well said that" writing a good business plan can't guarantee success, but it can go a long way towards reducing the odds of failure". Do you agree with the given statement? If yes , suggest various formats of Business Plan to be prepared by the entrepreneurs while starting up a new enterprise to enjoy maximum benefits. [6]

24. How does the 'nature of products' and 'nature of market' affect the selection of channels of distribution? Draw a suitable chart showing the nature and suitable channel of distribution for various factors of the above mentioned. [6]