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| **PB1/MAQP/1222/A 28-NOV-2022** | | | | | | | | | | | |
| **PRE-BOARD EXAMINATION - I (2022-23)** | | | | | | | | | | | |
| **Subject: MATHEMATICS**  **Grade: 12** | | | | | Max. Marks:80Time:3 hr | | | | | | |
| ***General Instructions***:   1. ***This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.*** 2. ***Section A has 18 MCQ’s and 02 Assertion-Reason based questions of 1 mark each.*** 3. ***Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.*** 4. ***Section C has 6 Short Answer (SA)-type questions of 3 marks each.*** 5. ***Section D has 4 Long Answer (LA)-type questions of 5 marks each. 6. Section E has 3 source based/case based/passage based/integrated units of assessment (4 marks each) with sub parts.*** | | | | | | | | | | | |
| **SECTION A** (Each question carries 1 marks) | | | | | | | | | | | | |
| **1.** | If Sin ,then x = ------- | | | | | | | | | | | |
|  | **a** | **0** | **b** | **1** | | **c** | **-1** | | | **d** | **1/2** | |
| **2.** | The value of | | | | | | | | | | | |
|  | **a** | **0** | **b** | **½** | | **c** | **1** | | | **d** |  | |
| **3.** | If A is a matrix of order 3x3, and (A. adjA)= 3 I . Find the value of | | | | | | | | | | | |
|  | **a** | 3 | b | 6 | | c | 18 | | | d | 24 | |
| **4.** | If y= | | | | | | | | | | | |
|  | **a** |  | **b** |  | | **c** |  | | | **d** |  | |
| **5.** | A=\_\_\_\_\_ | | | | | | | | | | | |
|  | **a** | **8** | **b** | **18** | | **c** | **2** | | | **d** | **6** | |
| **6.** | = \_\_\_ | | | | | | | | | | | |
|  | **a** | **0** | **b** | **1** | | **c** | **-1** | | | **d** | **2** | |
| **7.** | Evaluate | | | | | | | | | | | |
|  | **a** |  | **b** |  | | **c** |  | | | **d** | **-** | |
| **8.** | If A= then = \_\_\_\_\_\_\_ | | | | | | | | | | | |
|  | **a** | **8** | **b** | **36** | | **c** | **64** | | | **d** | **16** | |
| **9.** | Which of the following statements is false | | | | | | | | | | | |
|  | **a** | Solu of LPP lies in the feasible region | b | Solu. Of LPP satisfies all constraints | | c | Solu need not satisfy all constraints | d | The constraints determine the feasible region | | | |
| **10.** | If A and B are symmetric matrices f same order, then AB-BA is a \_\_\_\_\_\_\_\_ | | | | | | | | | | | |
|  | **a** | Symmetric matrix | **b** | Skew symmetric matrix | | **c** | Zero matrix | | | **d** | Unit matrix | |
| 11. | The value of | | | | | | | | | | | |
|  | a | 3 | b | 2 | | c | 0 | | | d | 1 | |
| 12. | Which among the following is both one -one and onto. | | | | | | | | | | | |
|  | a | f(x)=x3 | b | f(x)=x+2 | | c | f(x)=2x+1 | | | d | f(x)=x2+1 | |
| 13. | For what value of ‘k’ is the function f(x)= | | | | | | | | | | | |
|  | a | 5/3 | b | 3/2 | | c | 8/3 | | | d | 2 | |
| 14. | Find the interval in which is increasing \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | | | | | | | |
|  | a | (2, | b | ( | | c | ( | | | d | (0,2) | |
| 15. | The solution set of the inequality 2x+3y >6 is | | | | | | | | | | | |
|  | a | An open half plane not containing the origin | b | And open half plane containing the origin | | c | The whole xy -plane not containing the line 2x+3y=6 | | | d | a closed half plane containing the origin | |
| 16. | If A and B are two events such that A and P(B) ,then which of the following is correct | | | | | | | | | | | |
|  | a | = | b | =1 | | c |  | | | d | None of these | |
| 17. | If ‘p’ and ‘q ‘are the degree and order of the differential equation . Then the value of 2p-3q = \_\_\_\_\_\_\_ | | | | | | | | | | | |
|  | a | -4 | b | -3 | | c | 2 | | | d | 1 | |
| 18. | The integrating factor of the equation | | | | | | | | | | | |
|  | **a** | log(1+ | **b** |  | | **c** |  | | | **d** | 1+ | |
|  | **ASSERTION- REASON BASED QUESTIONS**  In the following questions statement of assertion (A) is followed by a statement of (R). Choose the correct answer out of the following choices.  (a) Both A and R are true, and R is the correct explanation of A  (b) Bothe A and R are true, but R is not the correct explanation of A.  (c) A is true but R is false  (d) A is false but R is true. | | | | | | | | | | | |
| 19. | Assertion (A); If y=  Reason (R): | | | | | | | | | | | |
| 20. | Assertion (A): f P (A) =0.2; P( B )= 0.3 and A and B are independent events the  P (A  Reason (R): When A and B are independent P ( A=P (A) + P( B ) | | | | | | | | | | | |
| **SECTION B (2 marks each)** | | | | | | | | | | | | |
| 21. | If x=a(cos and y=a sin . Prove that | | | | | | | | | | | |
| 22. | Find the value of | | | | | | | | | | | |
| 23. | If y= If Find | | | | | | | | | | | |
| 24. | For the curve y= 2x-5x3, if x increases at the rate of 2 units/sec, Find the rate at which the slope of the curve is changing when x=3 units. | | | | | | | | | | | |
| 25. | Let X denote the number of hours you study. The probability that X can takes the values X, has the following form, where ‘k’ is a constant  P(X=x)  Find the value of k? | | | | | | | | | | | |
| **SECTION C** ( 3 marks each) | | | | | | | | | | | | |
| 26. | Find the particular solution of the differential equation dy=Cosx (2-ycosecx) dx, given that y=2,x=  OR  Solve the differential equation y dx - (x+2 | | | | | | | | | | | |
| 27. | Integrate | | | | | | | | | | | |
| 28. | Evaluate  Or  Evaluate | | | | | | | | | | | |
| 29. | Evaluate | | | | | | | | | | | |
| 30. | Bag A contains 4 black, and 6 red balls and bag B contains 7 black and 3 red balls. A die is thrown. If 1 or 2 appears on it, then bag A is chosen, otherwise bag B. If two balls are drawn at random (without replacement) from the selected bag, find the probability of one of them being red and another black. | | | | | | | | | | | |
| 31. | Solve the following Linear Programming problem graphically:  Maximize Z=8000x+12000y subject to the constraints 9x+12y | | | | | | | | | | | |
| **SECTION D**  ( Each Question carries 5 marks ) | | | | | | | | | | | | |
| 32. | Make a rough sketch of the region given below and find its area using the method of integration: | | | | | | | | | | | |
| 33. | Show that the differential equation 2yis a homogenous equation and find its particular solution, given that x=0 when y=1 | | | | | | | | | | | |
| 34. | If A= Find and use it solve the system of equations  x+2y+z=1; -x+ y+ z=0; x-3y+z=2 | | | | | | | | | | | |
| 35. | Let N denote the set of all natural numbers and R be the relation on NXN defined by Show that R is an equivalence relation.  OR  Determine whether the relation R defined on the set R of all real numbers as  R= is reflexive , symmetric and transitive. | | | | | | | | | | | |
| **SECTION E**  ( ***3 Case study based questions of 4 marks each with two sub parts .First two case study questions have three sub parts (i) (ii) ( iii) of marks 1,2,1 respectively. The third case study question has two sub parts of 2 marks each.)*** | | | | | | | | | | | | |
| 36. | ***Case Study 1***: Read the following passage and answer the question given below    A person wants to plant some trees in his community park. The local nursery charges the cost of planting trees by the following formulae: C(x)=x3-45x2+600x. where x is the number of trees and C(x) is the cost of planting x trees in rupees. The local authority has imposed a restriction that it can plant 10 to 20 trees in one community park for a fair distribution.   1. Find the critical point of the function? 2. Show how you determine the number of trees if he has to spend the least amount 3. Find the least amount he has to spend? | | | | | | | | | | | |
| 37. | ***Case Study 2***: Read the below question and answer the following  See the source image  A water tank of a municipality is in the shape of a conical funnel of semi-vertical angle and water is dripping out at the uniform rate of 2 in the surface area, through a tiny hole at the vertex of the bottom. With the above given information find the answers of the following   1. the relation between the radius and the slant height? 2. the rate of decrease of the slant height of water? 3. If the radius is 10 m. then the rate of decrease of the slant height of water? | | | | | | | | | | | |
| 38. | ***Case Study 3***: Read the following question and answer the questions given below326 Panel Interview Stock Photos, Pictures & Royalty-Free ...  Three persons A, B and C apply for a job of manager in a private company. Chances of their selection (A, B and C) are in the ratio 1:2:4. The probabilities that A, B and C can introduce changes to improve profits of the company are 0.8,0.5 and 0.3 respectively.  If A, B, C are the events of the selection of three candidates and E be the event that change does not take place   1. What is probability of E? 2. If the change does not take place, then what is the probability that it is due to the appointment of C? | | | | | | | | | | | |

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