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| **UT/MAAK/1223/A 6-NOV-2023** | | | | | | | | | |
| **UNIT TEST (2023-24)**  **ANSWER KEY** | | | | | | | | | |
| **Subject: MATHEMATICS**  **Grade: 12** | | | | | Max. Marks:50Time:2 hours 30 min | | | | |
| **SECTION A** (Each question carries 1 marks) | | | | | | | | | |
| **1.** | The integrating factor of the equation | | | | | | | | |
|  | **a** | log(1+ | **b** |  | | **c** |  | **d** | 1+ |
| **2.** |  | | | | | | | | |
|  | a | x +c | b | x +c | | c | x +c | d | +c |
| **3.** | 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 |
| **4.** | If ‘p’ and ‘q ‘are the degree and order of the differential equation . Then the value of 2p-3q is | | | | | | | | |
|  | **a** | **1** | **b** | **2** | | **c** | **-1** | **d** | **-4** |
| **5.** | If and is a vector such that = and , then is equal to | | | | | | | | |
|  | **a** | (a) | **b** | **7** | | **c** |  | **d** | **3** |
| **6.** | The projection of the vector  on the vector   is | | | | | | | | |
|  | **a** |  | **b** |  | | **c** |  | **d** |  |
| **7.** | Solution of when y(0)=1 is given by | | | | | | | | |
|  | **a** | **xy= -** | **b** | **xy= -** | | **c** | **xy= -1** | **d** | **y=2** |
| **8.** | Evaluate | | | | | | | | |
|  | **a** | **1** | **b** | **0** | | **c** |  | **d** |  |
|  | **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. | | | | | | | | |
| 9. | Assertion (A): - | x-1 | + 3 is defined for all real values of x except x = - 1.  Reason (R): Maximum value of f(x) is 3 and Minimum value does not exist. | | | | | | | | |
| 10. | Assertion (A): = log +C, where C is a constant of Integration.  Reason (R): = log+C, where C is the constant of Integration | | | | | | | | |
| **SECTION B (2 marks each)** | | | | | | | | | |
| 11. | Evaluate:    **Adding & subtracting**    **Let log x = t** | | | | | | | | |
| 12. | Using integration, find the area of the region bounded by the line x-y+2=0 and the curve and the y axis.  x-y+2=0 ,  Points of intersection: x=2 and x=-1  C:\Users\DPSSTAFF\Desktop\Area.PNG  Required area==  = | | | | | | | | |
| 13. | If be a unit vector  =1  Squaring both sides,  3=2 cos  cos=  = | | | | | | | | |
| 14. | Find the Integrating factor: (1+tany) (dx- dy) +2xdy=0    IF ) | | | | | | | | |
| 15. | Solve the differential equation:  Given  Putting = v or y = vx = v + x  Putting the values of and in equation (i), we get    –      Integrating both sides we get,    Or = log + C | | | | | | | | |
| **SECTION C** ( 3 marks each) | | | | | | | | | |
| 16. | Using integration find the area of the region included between the parabola  and the line  x + y=2.    Ordinate of intersection points are 1 & – 2 therefore  Required area  = area ABCD A – *area* ABEA | | | | | | | | |
| 17. | Solve the differential equation | | | | | | | | |
| 18. | Evaluate  I= I= =  2I=  Let :  = | | | | | | | | |
| 19. | Find the vector of magnitude units that are perpendicular to the plane of vectors and.        ) | | | | | | | | |
| **SECTION D**  ( Each Question carries 5 marks ) | | | | | | | | | |
| 20 | Evaluate : dx  Let sin x = t, so cosx dx=dt  dt  Let  Equating the coefficient of t and constant term, A= 2 and B = 7  +  4 +  4 +7 log + C | | | | | | | | |
| 21 | Solve the following Linear Programming problem graphically:  Maximize Z=8000x+12000y subject to the constraints 9x+12y | | | | | | | | |
|  | Chart  Description automatically generatedThen to maximize the function Z = 8000*x* + 12000*y*  Subject to the constraints: 3*x* + 4*y* 60, *x* ­+ 3*y* 30, *x*0, *y*0  [1 mark for 2 lines drawn correctly and ½ mark for correct shading, 1 mark for corner point table]   |  |  | | --- | --- | | At Corner Points | Profit | | (0, 0) | Rs.0 | | (20, 0) | Rs.160000 | | (12, 6) | Rs.168000(Maximum) | | (0, 10) | Rs.120000 |   Maximum Z = **168000** | | | | | | | | |
| **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.)*** | | | | | | | | | |
| 22. | i) Find the distance between house and school. Ans: 6 units  ii)Find the unit vector along BD.Ans: 1/3(2i-j +2k)  iii) Find the area of the triangle formed by ABD. Ans 9 sq units | | | | | | | | |
| 23 | i) x2y =1024  ii)C(x)= 10x2 +10240/x  iii) x=8, C= Rs1920 | | | | | | | | |

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