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| **PB2/MAEEEAK/1222/A 09-JAN-2023** |

**EEE CONSORTIUM**

**PRE-BOARD EXAMINATION – II (2022-2023)**

**MARKING SCHEME-SET1**

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| **SUBJECT: Mathematics**  **GRADE: XII** | **Maximum Marks: 80****Time Allowed: 3 Hours** |

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| **SECTION A**  **(Multiple Choice Questions) Each question carries 1 mark** | | **MARKS** |
| **1.** |  | 1 |
| **2.** | (c) ±3 | 1 |
| **3.** | (a) | 1 |
| **4.** | b) 3 | 1 |
| **5.** | d) | 1 |
| **6.** | d) not defined | 1 |
| **7.** | b)(0, 8) | 1 |
| **8.** | (b) 5/√6 | 1 |
| **9.** | b) e-1 | 1 |
| **10.** |  | 1 |
| **11.** | d)60 | 1 |
| **12.** | a) | 1 |
| **13.** | b) | 1 |
| **14.** |  | 1 |
| **15.** | b) *Secx* | 1 |
| **16.** | b) | 1 |
| **17.** | c)0 | 1 |
| **18.** | c) 3 |  |
|  | **ASSERTION-REASON BASED QUESTIONS** |  |
| **19.** | b | 1 |
| **20.** | c) | 1 |
| **SECTION B**  **This section comprises of very short answer type-questions (VSA) of 2 marks each** | |  |
| **21.** | **OR**  Let . Let  But    Let  such that | 1  1  1  1 |
| **22.** | Let the length of the rectangle be and its breadth Then . Area = . | 1  1 |
| **23.** | Here,  ∴    Vector perpendicular to both and is  ) X (  =  ∴ Unit vector perpendicular to both ) and (  =  =  **OR**  We know that the direction cosines of the line passing through two points P (x1, y1, z1) and Q (x2, y2, z2) are given by  Using the distance formula,  From the given,  P (x1, y1, z1) = (-2, 4, -5) Q (x2, y2, z2) = (1,2,3)  Hence, the direction cosines of the line joining the two given points are | 1  1  1  1 |
| **24.** | At L.H.L.= , let R.H.L.= , let  Since is continuous at . Therefore L.H.L.= R.H.L.= | 1  1 |
| **25.** | Given = 1  As + = 2      = | 1  1 |
|  | **SECTION C**  **(This section comprises of short answer type questions (SA) of 3 marks each)** |  |
| **26.** | Let = +  On solving we get ,  A = -2/13 ,  B= 2/13,  C=7/13  I= log(x+3) + log(+4)+ tan-1()+C | 1  1  1 |
| **27.** | ……………………………….[1]    Let X be the number of selected scouts who are well trained in first aid.  Here random variable X may have values 0, 1, 2  Now P (X= 0) = =  …………………. [ ½ ]  P (X= 1) = = …………………..[ ½ ]  P (X= 2) = = ……………………………..[ ½ ]  Distribution table   |  |  |  |  | | --- | --- | --- | --- | | X | 0 | 1 | 2 | | P (X) |  |  |  |   [ table carries ½ mark]  Mean = | 1  1  1  1  1  1 |
| **28.** | By , we get = …..(2) Adding (1) and (2), we get + = = =  = =  =  = = = =  **(OR)**  *……… (1)*  *By , we get*  *= …… (2)*  Adding (1) and (2), we get  = = 2, ( Using )  =  Put . When  = = = =  So, | 1  1  1  1  1  1 |
| **29.** | Let ,  Therefore  Integrate, we get  **(OR)**  ……….(1)  This is a linear differential equation of and , having I.F.=  Multiplying both sides of (1) by IF and integrate, we get  + c  Therefore + c | 1  1  1  1  1  1 |
| **30.** | 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** | 1  1  1 |
| **31.** |  | 1  1  1 |
|  | **SECTION D**  **(This section comprises of long answer-type questions (LA) of 5 marks each)** |  |
| **32.** | Diagram, engineering drawing  Description automatically generated1 mark for diagram, 1 mark for point of intersection,  Point of intersection  Required area = ……….[1]  ……………..[1]  ………[1] |  |
| **33.** | ……………..[1]  If  …………………….[1]  …………………………..[2]  ……………………………….[1]  **OR**  ..[1]  If  …………………….[1]  …………………………………….[2]  ……………………….[1] |  |
| **34.** | Consider, the line  i.e.,  here, …. (i)  Consider, the line    Here …. (ii)  Shortest distance between the lines  =  Now (from (i) and (ii))    ∴ Shortest distance =  units  **OR**  Equation of line passing through (2, 1, 3) can be taken as  …(i) ……………………………….[1]  It is perpendicular to the lines  …(ii) and …(iii)  Then a + 2b + 3c = 0 and -3a + 2b + 5c = 0. ……………………………..…..[1]  = = …………………………………..[1]  = = or = = ……………………………………….[1]  Putting these values in equation (i), we get  Equations of required lines are …………………………..[1] | 1  1  1  1  1 |
| **35.** | Let award money for Honesty, Regularity and Hard work be and respectively. According to given conditions, , and Corresponding matrix equation is = . The given equation can be written as AX = B adj A= . Now Now ,  and  Therefore award money for Honesty , award money for Regularity and award money for Hard work | 1  1  1  1  1 |
|  | **SECTION E** |  |
| **36.** | 1. is a polynomial function so is differentiable everywhere so in particular (0,15) also   Given is a critical point  =0   1. Now   =>   * is increasing in (5,15) * is decreasing in (0,5)   **Or**   * is the critical point * is the point of local minima   x x  = is the local minimum | 1  1  2 |
| **37.** | Diagram  Description automatically generated**Case study 2 (1 + 1 + 2)**  i)Given    ii)  iii)  Hence by first derivative test, is a point of local maxima |  |
| **38.** | Let events be the following: the bolt manufactured by machine A, the bolt manufactured by machine B and the bolt manufactured by machine C. Given that and Let E be the event that the bolt is defective. Now , and a) b) | 2  2 |

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