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| **FE/MAAK/1119A 01/03/2020** |

**EEE CONSORTIUM**

**FINAL EXAMINATION (2019-20)**

**Subject- Mathematics**

**Class- XI**

Time:- 3 hours Maximum Marks- 80

**ANSWER KEY**

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| Sl.No. | Value points/ Solutions/ Answer | M |
| 1 | [1, )**( Ans.- d**) | 1 |
| 2 | 2 , -3 **( Ans.- b**) | 1 |
| 3 | -1 **( Ans.-d)** | 1 |
| 4 | **( Ans.-b)** | 1 |
| 5 | P(k) = m(k) + 5**( Ans.-b)** | 1 |
| 6 | **( Ans.-b)** | 1 |
| 7 | **( Ans.-c)** | 1 |
| 8 | **( Ans.-a)** | 1 |
| 9 | -243**( Ans.-b)** | 1 |
| 10 | 12**( Ans.-c)** | 1 |
| 11 | y+7=2  OR  6 sq.units | 1 |
| 12 |  | 1 |
| 13 | 9 | 1 |
| 14 | B (0,3,0) | 1 |
| 15 | 5 or -3 | 1 |
| 16 |  | 1 |
| 17 |  | 1 |
| 18 | = 22.85  **(OR)**  2.5 | 1  1 |
| 19 | Since a number greater then 5000 is formed so leftmost numbers are 7 or5.  The remaining 3 digits can be filled by digits 0, 1 , 3 , 5and 7 as repetition of digit is allowed.  So total number of 4 digits to make a number greater than 5000 = 2X 5X5X5 -1   * 250 -1 =249   Number is divisible by 5 if unit place has digits 0 or 5.  Total number of digits divisible by 5 is 2 X 5 x 5 x1 -1= 99  So probability = = | 1 |
| 20 | S = 6 +4 +8 = 18  n(S) = 18C3 = 816  E1 – Event all the three balls are red  n(E1)= 6C3 = 20  P(E1)= = | 1 |
| 21 | (a) R = { (a,b) : a,b N and a = b2 }  Since 2 but 2 22 => 2 4  So it is not true that (a, a) R for all a N  (b) Let (9 ,3 ) because 9 = 32 but (3 ,9) does not part of R because 3 92  So it is not true that (a, b ) R implies that (b, a) R.  **OR**  Let  Since x R, 0 🢧 0 🢧 0  🢧 . Hence Range of f = [0, 1) | 1+1  1+1 |
| 22 | T7 = 8C6()(2x2)6  = 28 x x 26 x x12  =4032 x10  **(OR)**  Tr = 20Cr(2x2)20-r ()  X40-3r = x10  R = 10  Coeff= 20C10210 | 1  1  1  1 |
| 23 | Let the equation of the given straight line be + = 1  By question, b = -a; hence, equation (1) reduced to x- y =a  Since line(2) passes through the point (5, 6) hence,  5 – 6 = a or a = -1  Therefore, the equation of required straight lie is x – y = -1 or x – y + 1 = 0.  Now, we are to find the co-ordinates of the point at which the ordinate is double the abscissa.  So, let the point be (a, 2a) and it lies on the line x – y + 1 = 0 | 1  1 |
| 24 | We have,  =  =  = | 1  1 |
| 25 | Total number of ways  No man  P(no man) = =  **(OR)**  Number of ways vowels come together = 5!.3!  Total number of ways 7!  P(E) = = | 1  1  1  1 |
| 26 | In a lottery 10000 tickets are sold and ten equal prizes are awarded. What is the probability of not getting a prize if you buy i) one ticket ii) two tickets iii) 10 tickets   1. Probability of not getting price if he buys one ticket= 2. Probability of not getting price if he buys 2 tickets= | 1  1 |
| 27) | . Find the general solution of the equation sin2x + sin 4x + sin 6x = 0  Sin2x + sin6x + sin4x =0  2sin4xsin2x + sin 4x = 0  Sin4x (2sin2x+1)= 0  Sin4x =0 or sin2x = - = sin (π+)  X = nπ /4 or x = nπ + (1)n  OR  Prove that sin10 sin50 sin60 sin 70 =  sin10 sin50 sin 70  sin10  sin10  = sin10  = | 1  1  1  1  1  2  1 |
| 28) | P (1) is true  4+15-1=18=9(2)  P (1) is true  Assume P(k) is true i.e.  4K+15k – 1 = 9(m), m  4K= -15k + 1 + 9(m)  To prove P(k+1) is true i.e.  4K+1+15(k+1) – 1 = 9(n), n  4.4K+15(k+1) – 1 = (9m-15k+1)4+15k+15-1  = 36m-60k+4+15k+14  = 36m-45k+18  = 9(4m-5k+18)  9(n) n  P(n) is true | 1  1  1  1 |
| 29) | ……(1)  ……(2)  ……(3)  The graphs of linear equations =10; = 1; =0 are drawn below.  Inequality (1) represents the region below the line, + 2 = 10 (including the line  + 2 = 10). Inequality (2) represents the region above the line, + = 1 (including the line + = 1). Inequality (3) represents the region above the line, – = 0 (including the line – = 0).  Since ≥ 0 and ≥ 0, every point in the common shaded region in the first quadrant including the points on the respective lines and the axes represents the solution of the given system of linear inequalities. | For table 2  For shading 2 |
| 30) | There are 12 letters, of which N appears 3 times, E appears 4 times and D appears 2 times and the rest are all different. Therefore  The required number of arrangements =   1. The required number of words starting with P are = . 2. Using multiplicative principle, the required number of arrangements= 3. The required number of arrangements = the total number of arrangements (without any restriction) – the number of arrangements where all the vowels occur together   = 1663200 –16800 = 1646400   1. The required number of arrangements =   **OR**  There will be as many ways of choosing 4 cards from 52 cards as there are combinations of 52 different things, taken 4 at a time. Therefore  The required number of ways = 52C4 = = = 270725   1. The required number of ways = 13C4 + 13C4 +13C4 +13C4   =4! =2860   1. The required number of ways are = 13C113C113C113C1   = 134   1. The required number of ways are 12C4 = 2. The required number of ways are = 26C2 x 26C2   = .   1. The required number of ways are = 26C4 + 26C4   = | 1  1  1  1  1  1  1  1 |
| 31) | This parabola has its axis on the y axis and it opens downward. so it  equation is of the type  x 2 = - 4 a y    The top of the parabola is its vertex passing through the origin. The width of the base is 5 mt, therefore the coordinates of the points P and Q are (-2.5, -10) and (2.5, 10) respectively. P and Q lie on the parabola.  Substituting the ccordinates of the point P in the equation of the  parabola, we have  (-2.5) 2 = -4a (-10)  6.25 = 40 a  a = =  Let 2w be the width of the arch at 2 m below the vertex. Therefore the coordinates of the points A and B A (-w, -2) and B (w, -2)  A and B lie on the parabola.  Substituting the coordinates of the point A in the equation of the parabola, we have  w 2 = - 4 () (-2)  w2=  w = x 0.5  2w= 2.23m | 1  1  1  1 |
| 32) | A (1,2,0)  Let the ratio be K:1  B (,,)  It cuts the line  2 (+)=7  6k+4-4k-3-5k+1=7k+7  -5=10k  K=-1/2  B (1, -2,7)  AB = = units | 1  1  1  1 |
| 33) | Tn= =  = = =  = =  Sn=  =  =  = | 1  1  1  1  1  1 |
| 34) | Let the coordinates of point A be (a, 0). Draw a line (AL) perpendicular to the x-axis. We know that angle of incidence is equal to angle of reflection. Hence, let ∠BAL = ∠CAL = Φ Let ∠CAX = θ ∴∠OAB = 180° – (θ + 2Φ) = 180° – [θ + 2(90° – θ)] = 180° – θ – 180° + 2θ = θ ∴∠BAX = 180° – θ  Now slope of line AC  …..(1)  Slope of the line AB =  …(2)  From equations (1) and (2), we obtain  Thus the coordinates of point A ).  **OR**  The perpendicular distance 1 from and 2 from to the line .  1 2  12 =  =  =  =  =  = . | 1  1  1  1  1  1  1  1  1  1  1  1 |
| 35) | , f(x+h) =  [f(x)] = lim  =  =  =  =  =  = =  **(OR)**  = -  = - | 1  1  1  1  1  1  1  1  1  1  1  1 |
| 36) | Given observed mean = 10 and observed S.D.= 2 = 10  Observed sum of the observation= 200 ………………..(1)  Also = 🢧 Observed sum of squares = 20 = 2080 ………………..(2)   1. When the wrong entry is omitted then the correct sum of remaining 19 observation= 200- 8 = 192 and correct sum of squares of remaining 19 observations = 2016   So correct mean = = 10.1  And correct S.D.= = 1. 997   1. When the incorrect entry 8 is replaced by 12, then correct sum = 200- 8 + 12 = 204 and correct sum of squares = 2080 – 64 + 144 = 2160   Therefore correct mean = = 10.2 and correct S.D.= = 1.99 | 1  1  2  2 |

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