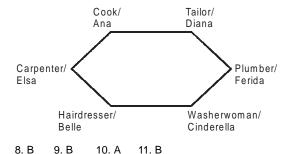
ANSWER KEY & SOLUTIONS - IIFT 2017-19

| 1 | Α | 2 | В | 3 | С | 4 | Α | 5 | В | 6 | С | 7 | С | 8 | В | 9 | В | 10 | Α |
|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|
| 11 | В | 12 | * | 13 | Α | 14 | Α | 15 | С | 16 | В | 17 | Α | 18 | D | 19 | В | 20 | В |
| 21 | D | 22 | D | 23 | Α | 24 | D | 25 | С | 26 | В | 27 | D | 28 | В | 29 | Α | 30 | Α |
| 31 | В | 32 | D | 33 | Α | 34 | Α | 35 | Α | 36 | Α | 37 | В | 38 | С | 39 | В | 40 | С |
| 41 | С | 42 | В | 43 | В | 44 | С | 45 | В | 46 | В | 47 | Α | 48 | С | 49 | D | 50 | С |
| 51 | В | 52 | D | 53 | С | 54 | С | 55 | В | 56 | С | 57 | С | 58 | В | 59 | С | 60 | В |
| 61 | Α | 62 | С | 63 | Α | 64 | С | 65 | D | 66 | Α | 67 | В | 68 | D | 69 | D | 70 | С |
| 71 | Α | 72 | В | 73 | С | 74 | В | 75 | C | 76 | С | 77 | Α | 78 | C | 79 | D | 80 | С |
| 81 | D | 82 | С | 83 | Α | 84 | В | 85 | Α | 86 | С | 87 | D | 88 | С | 89 | Α | 90 | D |
| 91 | С | 92 | Α | 93 | D | 94 | Α | 95 | Α | 96 | В | 97 | D | 98 | В | 99 | D | 100 | В |
| 101 | С | 102 | В | 103 | D | 104 | D | 105 | С | 106 | D | 107 | D | 108 | D | 109 | O | 110 | Α |
| 111 | Α | 112 | Α | 113 | В | 114 | D | 115 | Α | 116 | В | 117 | D | 118 | В | 119 | С | 120 | В |
| 121 | D | 122 | С | 123 | В | | | | | | | | | | | | | | |

- A CDB is 2 triangles ahead of GHF in the CW direction and both GHF, CDB have alphabets in the same order in their respective triangles.
- 2. B HNP & DLP are vertices of 2 different triangles. We are moving anticlockwise from HNP to DLP. This means we have to move ACW from PDA. While in option PHE we are moving clockwise from PDA. So PHE is not possible. Also answer has to start from P. Answer can't be PME because it's a straight line. Hence answer is PJG.
- Line IO comes after AK in ACW direction. Thus CL must be after EM in ACW direction. By observing closely the 2 options starting with EM, we get the answer as EMDL.
- A BPM is not a triangle. BPM is almost opposite to GN. So FP is almost opposite to AK. Hence answer is FPO.
- 5. B (a) If the Maternal grandmother is from tribe A, then mother will be from tribe A and the female is from tribe A. As given that the female is from tribe B, so statement a is false.
 - (b) If paternal grandmother is from A, then father is from tribe A and after marriage, he will become member of tribe B. His daughter, the female will be of tribe B. Hence statement b is true.
- 6. C We will check the options one by one.
 - (a) If the boy is born in tribe B then he will marry in tribe A and his daughter will be in tribe A. Hence it is incorrect.
 - (b) If the boy is born in tribe B, then he will marry in tribe A. His son will be in tribe A. So his daughter in law will be from tribe B. Hence it is incorrect.

- (c) If the boy is born in tribe B, then his mother's brother can be from tribe B and his father's brother can be from tribe A. Hence it is correct.
- (d) If the boy is born in tribe B, then he will marry in tribe A and his divorced son will be in tribe A. Hence option (D) is incorrect.
- 7. C (a) Any widower will return to his tribe. So he can marry his wife's sister which is from other tribe. Hence this marriage is permissible.
 - (b) This marriage is also permissible as the divorced husband will return to his tribe. Hence the mother can marry the divorced husband of her daughter.
 - (c) The mother's brother will be of same tribe as that of girl. Hence the girl cannot marry him. Hence this marriage cannot take place.
 - (d) Any widower will return to his own tribe A. His brother's widow will be of tribe B. So he can marry his brother's widow.

For questions 8 to 11: The arrangement is given below.



For questions 12 to 14:

From the given information We can infer that Admin \rightarrow E & G (female) Finance \rightarrow C, A and one of B & E Logistics \rightarrow H and one of B & E.

Order of income \rightarrow G > H > A > F, B, E > C

- 12. * Finance department will have 3 people and in official answer key, the question is deleted.
- 13. A B earns less than A and H.
- 14. A H is at 2nd in descending order of income.
- 15. C As all Fathers are Males, i.e. the set Fathers is a subset of the set Males; and some Doctors may be Males or Fathers, i.e. the set Doctors cuts across the sets Males and Fathers.

16. B
$$(2+6) \times (15-5) = 80$$

 $(7+6) \times (9-4) = 65$
Similarly, $(16+8) \times (13-11) = 24 \times 2 = 48$.

17. A 10, 26, 74, 218, 654

$$10 \times 3 - 4 = 26$$

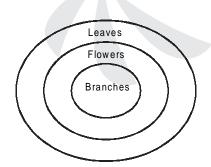
 $26 \times 3 - 4 = 74$
 $74 \times 3 - 4 = 218$
 $218 \times 3 - 74 = 650$

Hence 654 is wrong and should be replaced by 650.

18. D Sum of alphabetic position in
$$1^{st}$$
 row = $1 + 4 + 1 + 3 + 2 + 2 + 4 + 3 + 3 = 23$
Similarly, sum of digits in 2^{nd} row = $1 + 3 + 1 + 2 + 4 + 2 = 13$
Since these are prime numbers, sum of all given and unknown alphabets in 3rd row should also be a prime number.
Thus, 3rd row = $1 + 2 + 3 + 4 + 4 + 3 + 1 + 1 = 19$ (taking D option as correct).

No other option gives a prime value in such manner, hence correct answer is (D).

19. B Option (B) is the right answer as can be confirmed by the following Venn Diagram:



For questions 20 to 22: The information is summarised below.

| Time slot | Person | Relation | Profession | | |
|---------------|------------|------------------|-------------------|--|--|
| 9 am – 10 am | Q (male) | Father | Cardiologist | | |
| 10 am – 11 am | T (male) | Mother's Brother | Radiologist | | |
| 11 am – 12 pm | S (female) | Mother | Gynaecologist | | |
| 12 pm – 1 pm | V (female) | Father's sister | General Physician | | |
| 1 pm – 2 pm | | LUNCH | | | |
| 2 pm – 3 pm | W (male) | Elder son | Orthodontist | | |
| 3 pm – 4 pm | R (female) | Younger daughter | Urologist | | |
| 4 pm – 5 pm | P (male) | Younger son | Neurologist | | |
| 5 pm – 6 pm | U (female) | Elder daughter | Pediatrician | | |

20. B

21. D

- 22. D If lunch break and subsequent working are reduced by 15 min. then the new timings in order will be 1:00 pm 1:45 pm (lunch), 1:45 pm 2:30 pm, 2:30 pm 3:15 pm, 3:15 pm 4:00 pm & 4:00 pm 4:45 pm.

 Since U is the last doctor and she is Pediatrician, daughter of Cardiologist will reach the clinic at 4:00 pm.
- 23. A Overall pass percentage for Anga

$$= \frac{\text{Total Pass(all years)}}{\text{Total Appeared(all years)}} \times 100$$

$$= \frac{850 + 770 + 1200 + 750 + 1190}{5000 + 5500 + 6000 + 5000 + 7000} \times 100$$

$$= \frac{4760}{28500} \times 100 = 16.7\%$$

24. D The total number of candidates passed in the given years is calculated as:

| Year | Number of Candidates |
|------|----------------------|
| 2012 | 3503 |
| 2013 | 3570 |
| 2014 | 4226 |
| 2015 | 3360 |

Hence, total number of candidates passed from all the kingdoms is the lowest for the year 2015.

25. C The pass percentage of Banga kingdom for the given years =

In 2012 =
$$\frac{640}{4000} \times 100 = 16\%$$

In 2013 = $\frac{810}{4500} \times 100 = 18\%$
In 2014 = $\frac{1235}{6500} \times 100 = 19\%$

In 2016 =
$$\frac{660}{6000} \times 100 = 11\%$$

Hence, it is the highest for 2014.

26. B Overall pass percentage for 2013 of all kingdoms

$$= \frac{770 + 810 + 275 + 1120 + 595}{5500 + 4500 + 2500 + 8000 + 3500} \times 100$$
$$= \frac{3570}{24000} \times 14.88\%.$$

27. D The total number of candidates passed in the given kingdoms can be calculated as:

Anga = 4760, Gandhar = 3890 Banga = 4225, Dwarka = 4880 Hence, it is the highest for Dwarka.

For questions 28 to 32:

Checking the visibility of given brands across the stores:

1. Astute:
$$\frac{111}{450} + \frac{48}{440} + \frac{91}{280} + \frac{30}{350} + \frac{80}{480} = 0.94$$
 (approx.)

2. Supreme :
$$\frac{128}{450} + \frac{55}{440} + \frac{79}{280} + \frac{111}{350} + \frac{65}{480} = 1.13$$
 (approx.)

3. Paramount :
$$\frac{69}{450} + \frac{116}{440} + \frac{50}{280} + \frac{101}{350} + \frac{105}{480} = 1.1$$
 (approx.)

4. Smash:
$$\frac{85}{450} + \frac{137}{440} + \frac{30}{280} + \frac{60}{350} + \frac{108}{480} = 1.06$$
 (approx.)

5. Ultimate:
$$\frac{57}{450} + \frac{84}{440} + \frac{30}{280} + \frac{48}{350} + \frac{122}{480} = 0.82$$
 (approx.)

- 28. B
- 29. A Astute has the lowest visibility in any store (i.e. in store 4).
- 30. A Total T-shirts given = 2000.

So, T-shirts of size M =
$$\frac{22}{100} \times 200 = 440$$
.

Total T-shirts of size M in stores 1, 2 & 5 = 10% of 1370 = 137. Hence, the remaining T-shirts of size M = 440 - 137 = 303. Now, since we want to minimize size M in store 4, so we maximize size M in store 3 which can be 280 only. Hence remaining will be in store 4 = 303 - 280 = 23.

31. B Share of Supreme brand in all the stores 128 + 55 + 79 + 111 + 65 = 438.

Percentage share =
$$\frac{438}{2000} \times 100 = 21.9\%$$

32. D Smash T-shirts = 420 Ultimate T-shirts = 341. Difference = 79.

The required percentage = $\frac{79}{341} \times 100 = 23.16\%$.

33. A The total investment in Energy sector in all the years
= 800 + 1200 + 500 + 1400 + 700 + 2500 + 600 + 1000 + 1100
+ 500 = 10300

The total investment in Financial sector in all the years = 1800 + 500 + 400 + 2000 + 1200 + 1600 + 1000 + 1500 + 700 + 1400 = 12100

Hence, the required ratio = 103:121 or 1:1.2.

| Sectors | Difference |
|--------------------|------------|
| Basic Materials | 4800 |
| Communications | 1300 |
| Consumer Cyclical | 3900 |
| Consumer Defensive | 1800 |
| Energy | 2900 |
| Financial Services | 1900 |
| Health care | 6600 |
| Real Estate | 3400 |
| Technology | 8100 |

Hence, answer is option (A)

| 4 | Year | Total DI |
|---|------|----------|
| | 2009 | 12400 |
| | 2010 | 8100 |
| | 2011 | 14500 |
| | 2013 | 16000 |

34. A

35. A

36. A

Since total is maximum for 2013 So, average will also be highest for 2013.

Total DI Sectors **Basic Materials** 10000 6300 Communications Consumer cyclical 4700 Consumer Defensive 7300 3700 Energy Financial services 5100 7500 Health care 13500 Real estate Technology 8200

Hence, consumer cyclical sector has received the second lowest investment from DI for the total period.

37. B Total DI = 66300 Total FI = 78400 Hence, required ratio = 2 : 2.36.

B. C Company A:
$$\frac{105 + 185 + 100 + 120 + 110}{5} = \frac{620}{5} = 124$$

Company B:
$$\frac{135 + 115 + 130 + 125 + 135}{5} = \frac{640}{5} = 128$$

Company C:
$$\frac{165 + 155 + 190 + 100 + 100}{5} = \frac{710}{5} = 142$$

So company C has maximum average annual expenses.

39. B For 2011:
$$\frac{120+180+150}{3} = \frac{450}{3} = 150$$

For 2012:
$$\frac{165 + 150 + 180}{3} = \frac{495}{3} = 165$$

For 2013:
$$\frac{135+165+180}{3} = \frac{480}{3} = 160$$

For 2014:
$$\frac{180+150+135}{3} = \frac{465}{3} = 155$$

So maximum average annual revenue is in the year 2012.

40. C Revenue of C in 2015 = 120 Revenue of C in 2012 = 180

The required percentage decrease =
$$\frac{180-120}{180} \times 100 = 33\%$$
.

41. C Average revenue of A in 2011, 2012, 2013

$$=\frac{120+165+135}{3}=\frac{420}{3}=140$$

Average revenue of B in 2013, 2014, 2015

$$=\frac{165+150+165}{3}=\frac{480}{3}=160$$

Difference = $20 \times 1000 = 20000$.

- 42. B Profit in 2011 = 120 105 = 15
 - Profit in 2012 = 165 185 = -20 (loss)

Profit in 2013 = 135 - 100 = 35

Profit in 2014 = 180 - 120 = 60

Profit in 2015 = 150 - 110 = 40

So by observation, % increase in 2013

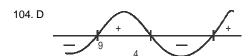
$$= \frac{35 - (-20)}{20} \times 100 = \frac{55}{20} \times 100 = 275\%$$

Hence it is maximum, so answer is B option.

- 43. B The passage is about how India has not developed its manufacturing sector. This makes Option (B) the correct choice. Option (A) and (C) are not mentioned in the passage. Option (D) is a criticism of the Indian approach to development (excessive focus on tech services).
- 44. C Options (A) and (B) extend beyond the scope of the passage. Option (D) is incorrect as it says 'do not require good infrastructure'. Option (C) has been directly mentioned in the passage.
- 45. B Option (A) and (D) are incorrect because of the usage of the phrase 'only' and 'better'. Option (B) is correct as the Services sector can create jobs for limited people only. Option (C) is incorrect as it is a general vague statement.
- 46. B Option (B) has been clearly stated in the passage. Option (A) is incorrect as it mentions mining and shipping which hasn't been mentioned in the passage.
- 47. A Option (B) is too narrow as it does not address the mismatch and it wrongly says 'useful for local markets'. Option (C) is extends beyond the scope of the passage. Option (A) is correct as can be seen from the fourth sentence of the passage.
- 48. C Option (C) is correct as it is clearly mentioned in the passage—
 "traditionally food and beverage companies have focused only on the first".
- 49. D Option (D) is mentioned in the first sentence of the passage.
- 50. C Option (C) has been mentioned in the passage and has been illustrated using the example of Kurkure.
- 51. B Option (B) is correct because it is mentioned in the passage as a central reason behind participation of women in the workforce. Options (A), (C) and (D) extend beyond the scope of the passage.
- 52. D Option (D) is the correct choice. Option (A) (B) are too narrow in their focus and Option (C) makes it an emerging countries vs developing countries debate which not what the passage is essentially about.

- 53. C Option (C) has been clearly mentioned in the passage.
- 54. C Option (C) has been clearly mentioned in the passage.
- 55. B Option (B) is the correct choice. Option (A) is close but is invalidated based upon the fact that the passage expands further the idea of SLAM.
- 56. C Option (C) is the correct answer as it is mentioned in the passage that having one eye is not a disadvantage to a robot.
- 57. C Only statements i and iv are mentioned in the passage.
- 58. B Option (A) is incorrect as it is nowhere mentioned in the passage. Option (C) and (D) are incorrect as they extend beyond the scope of the passage. Option (B) is mentioned in the passage in the sentence 'enough measurements....'.
- 59. C Endemic means native to a place; Equipoise means a balance of forces; Dogmatic refers to unwillingness to change from fixed 'dogmas'; Emollient is to be conciliatory; encomium means a 'eulogy' or high praise.
- 60. B Encomium means a 'eulogy' or high praise; Espouse is to support.
- 61. A Tedious can mean dreary or tiring; Tenacity is a synonym of doggedness.
- 62. C Emollient means conciliatory; Obloquy means verbal abuse.
- 63. A Apogee is the antonym of Nadir; Warranted is the antonym of Unjustified; Epiphany is the antonym of secret; Baleful is the antonym of extrovert.
- 64. C Vexation is the antonym of Happiness, Baleful is the antonym of Benevolent, Recluse is the antonym of Extrovert, Itinerant is the antonym of Static.
- 65. D Debutante is a French word.
- 66. A Obvious is a latin word.
- 67. B Soccer is an English.
- 68. D The correct spelling is "Danseuse"
- 69. D The correct spelling here is "Acoustic"
- 70. C Sultry applies in this case as the sentence would be idiomatically incorrect with traumatically.
- 71. A Herald is correct as it would apply in the case of people welcoming the celebrations of a traditional festival.
- 72. B Exhorting is the correct choice as the other options would change the tone of the sentence.
- 73. C Bagful is the correct choice in this case list/token wouldn't apply.
- 74. B Option (B) arranges the sentence correctly as the subject Mandel must be followed by (c) which will lead to (d).
- 75. C Option (C) is the correct choice as the difference mentioned in the beginning is followed the death and birth-rates in (b) which is followed (a).
- 76. C Chip on shoulder means to have a grievance.
- 77. A Doozy means something unique.

- Doughboy is used in this case to suggest overweight. The other options all refer to being thin.
- 81. D 82. C 83. A 84. B 79. D 80. C 85. A 86. C
- 91. C 92. A 87. D 88 C 89 A 90 D 93. D 94. A
- 100. B 101. C 102. B 95. A 96. B 97. D 98. B 99. D
- 103. D



We have
$$\frac{x-7}{x^2+5x-36} > 0$$

$$\frac{x-7}{(x+9)(x-4)} > 0$$

The solution set is $(-9, 4) \cup (7, \infty)$

The least integral value of x is -8.

105. C Taking the first term (a) to be 280 $\left(350 \times \frac{4}{5}\right)$ and applying the

formula for infinite G.P.

$$\Rightarrow \frac{a}{1-r} = \frac{280}{1-\frac{4}{5}} = 1400 \,\text{m}.$$

Now since the ball travels any distance twice, up and down, we take $2 \times (1400) = 2800 \text{ m}$.

Hence, total distance will be 2800 + 350 (as the ball was thrown from a height of 350 m initially and only this distance is covered once) = 3150 m.

- 106. D We have $4 \log_7 (x 8) = \log_3 81$ $\Rightarrow 4 \log_7 (x 8) = \log_3 3^4$ $\Rightarrow 4 \log_7 (x 8) = 4$ $\Rightarrow \log_7 (x 8) = 1 \Rightarrow x 8 = 7 \Rightarrow x = 15.$
- 107. D 5 students out of 4 boys and y girls can be chosen in 2 ways: (i) 3 Boys & 2 Girls = ${}^4C_3 \times {}^yC_2$ (ii) 4 Boys & 1 Girl = ${}^4C_4 \times {}^yC_1$

Since only boys are given a ball.

Thus, total balls given to 3 boys each in 1st case + Total balls given to 4 boys each in 2nd case = 368. \Rightarrow 3 × ${}^{4}C_{3}$ × ${}^{y}C_{2}$ + 4 × ${}^{4}C_{4}$ × ${}^{y}C_{1}$ = 368

$$\Rightarrow 3 \times 4 \times \frac{y(y-1)}{2} + 4 \times 1 \times y = 368$$

$$\Rightarrow 6y (y - 1) + 4y = 368 \Rightarrow 6y^2 - 6y + 4y = 368$$

\Rightarrow 3y^2 - y = 184 \Rightarrow y(3y - 1) = 184

$$\Rightarrow 3v^2 - v = 184 \Rightarrow v(3v - 1) = 184$$

Using options, we can check that only option (D) satisfies the above equation.

- 108. D There are two vowels I and A in RIYADH
 - (i) Consider these two vowels IA as one unit.
 - .. Number of ways in which 2 vowels can be arranged together $= 5! \times 2! = 240$

Hence statement (i) is false.

(ii) Total number of arrangements = 6! = 720.

Number of ways in which vowels do not occur together = 720 - 240 = 480.

Hence, statement (ii) is false.

- 109. C Let farmer A has 'x' hectare land.
 - ∴ Total production of A = 20x Farmer B has x + 7 hectare land
 - Total production of B = $(x + 15) \times 30$

Given that $(x + 15) \times 30 - 20x = 530$

- $\Rightarrow 30x + 450 20x = 530 \Rightarrow 10x = 80 \Rightarrow x = 8.$
- \therefore Production of farmer A = 20x = 20 x 8 = 160 bushels.

Let the distance between Delhi and Noida be x km.

Let they first meet at point A after one hour.

Distance covered by Shruti = (2x - d) km

Distance covered by Krishna = d km

∴ Ratio of speeds of Shrutit and Krishna = 2x - d : d ...(i) Let they meet next at B after half an hour. As Krishna covered

distance 'd' in one hour, so he will cover distance $\frac{\text{'d'}}{2}$ in half an hour.

$$\therefore$$
 AB = $\frac{d}{2}$

Distance covered by Shruti in second meeting

$$= x - d + \left(x - \frac{3d}{2}\right) = 2x - \frac{5d}{2}$$

Ratio of speeds of Shruti and Krishna is $2x - \frac{5d}{2} \cdot \frac{d}{2}$...(ii)

Now Krishna covered distance 'd' in one hour, so he will cover distance x in 2 hours.

111. A Let SP of each article be Rs. 100.

Thus,
$$CP_1 = \frac{100}{87} \times 100 = 115$$
, $CP_2 = \frac{100}{123} \times 100 = 81.3$

and
$$CP_3 = \frac{100}{74} \times 100 = 135.1$$
.

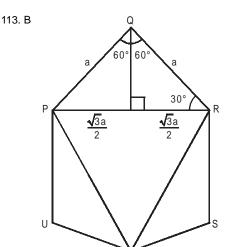
Hence, total CP = 331.4.

Percentage by which CP is lower/higher than SP

$$= \frac{331.4 - 300}{300} \times 100 = 10.5\% \text{ higher.}$$

112. A If I do 2 units per day, my roommate will do 1 unit per day. Together we do 3 units per day.

Now I will take 45 days for 90 units and my roommate will take 90 days for the same.



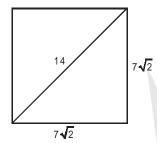
The side of triangle PRT = $\sqrt{3}a$

$$\therefore \quad \text{Area of } \Delta \text{PRT} = \frac{\sqrt{3}}{4} \times \left(\sqrt{3}a\right)^2 = \frac{3\sqrt{3}}{4}a^2.$$

$$\therefore \quad \text{Required ratio is } \frac{3\sqrt{3}}{4}a^2 \times \frac{4}{6\sqrt{3}a^2} = \frac{3}{6} = \frac{1}{2} = 0.5.$$

- 114. D Total students = 290. Let 80 students do not study either Spanish or Mandarin.
 - ∴ No. of students who study Spanish or Mandarin or both = 290 - 80 = 210.
 - $\begin{array}{ll} \therefore & n(S \cup M) = n(S) + n(M) n(S \cap M) \\ \Rightarrow 210 = 120 + 100 n(S \cap M) \\ \Rightarrow n(S \cap M) = 10 \end{array}$
 - .: Number of students who study Spanish but not Mandarin = 120 - 10 = 110.
- 115. A The Volume of Cylinder = $15 \times 49\pi$

The rectangle solid is placed in cylinder such that each of the corners of solid is tangent to walls of cylinder. Hence, the diameter of cylinder will be diagonal to the square base. As the diameter of cylinder is 14, so diagonal of square is 14 and hence side of square is $7\sqrt{2}$.



The volume of solid = $7\sqrt{2} \times 7\sqrt{2} \times 12 = 98 \times 12$

 \therefore The volume of the liquid = $15 \times 49\pi - 98 \times 12 = 147 (5\pi - 8)$.

116. B The total number of arrangements =

$$^{15}P_3 = \frac{15!}{12!} = 15 \times 14 \times 13 = 2730.$$

117. D We have
$$54 + 55 + 56 + \dots + 196 = \frac{143}{2} [54 + 196] = 17875.$$

118. B P(P) = 1
$$\frac{1}{2^n}$$
 (when all males) $-\frac{1}{2^n}$ (when all females)

$$P(Q) = \frac{1}{2^{n}} \text{ (when all males)} + \frac{n \times 1}{2} \times \frac{1}{2^{n-1}} \text{ (when one female)}$$

and rest males)

 $P(P \cap Q)$ = exactly one female

$$= n \times \frac{1}{2} \times \frac{1}{2^{n-1}}$$

For independent events

$$P(P \cap Q) = P(P) \times P(Q)$$

$$\frac{n}{2^n} = \left(1 - \frac{1}{2^n} - \frac{1}{2^n}\right) \left(\frac{1}{2^n} + \frac{n}{2^n}\right)$$

Solving we get n = 3.

119. C The number of parking spaces

=
$$20 + 21 + 23 + \dots = 20 + \left[\frac{16}{2}[2 \times 21 + 15 \times 2]\right]$$

= $20 + [8[72]] = 20 + 576 = 596$.

120. B We have

$$2^{\frac{1}{2}}, 3^{\frac{1}{3}}, 4^{\frac{1}{4}}$$
= $2^{\frac{1}{2} \times 12}, 3^{\frac{1}{3} \times 12}, 4^{\frac{1}{4} \times 12}$
= $2^{6}, 3^{4}, 4^{3} = 64, 81, 64$. As 81 is the largest number among the above numbers so $\frac{1}{3^{3}}$ is the highest number.

121. D Number of ways in which a candidate can fail to secure cut offs. $= {}^{6}C_{0} + {}^{6}C_{1} + {}^{6}C_{2} + {}^{6}C_{3} + {}^{6}C_{4} = 2^{6} - 1 = 63$

$$= {}^{6}C_{0} + {}^{6}C_{1} + {}^{6}C_{2} + \dots {}^{6}C_{5} = 2^{6} - 1 = 63.$$

122. C
$$4 + 44 + 444 + \dots$$
 n terms
= 4 (1 + 11 + 111 + \dots n terms)
= $\frac{4}{9}$ (9 + 99 + 999 + \dots n terms)
= $\frac{4}{9}$ [(10 - 1) + (100 - 1) + (1000 - 1) + \dots n terms]
= $\frac{4}{9}$ [10 + 100 + 1000 + \dots -n] = $\frac{4}{9}$ $\left[\frac{10(10^{n} - 1)}{9} - n\right]$
= $\frac{40}{81}$ (10ⁿ - 1) - $\frac{4n}{9}$.

123. B The two sides of the square are

$$6x - 8y = 15$$
 and $4y - 3x = 2$
or $6x - 8y = 15$...(1)
and $6x - 8y = -4$...(2)

These two lines are parallel. So the distance between these lines is the side of the square.

:. Side of square =
$$\frac{|15 - (-4)|}{\sqrt{6^2 + 8^2}} = \frac{19}{10}$$

.. Area of square
$$= \left(\frac{19}{10}\right)^2 = \frac{361}{100} = 3.61 \text{ sq. unit.}$$