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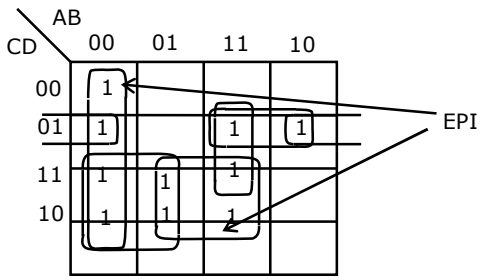
Answer Keys

1	A	**2**	D	**3**	C	**4**	D	**5**	C	**6**	D	**7**	C
8	C	**9**	B	**10**	A	**11**	D	**12**	B	**13**	B	**14**	A
15	C	**16**	C	**17**	C	**18**	190	**19**	4	**20**	124	**21**	99.85
22	D	**23**	C	**24**	C	**25**	A	**26**	A	**27**	D	**28**	C
29	D	**30**	D	**31**	B	**32**	D	**33**	A	**34**	45	**35**	352
36	1.6	**37**	134	**38**	0.6	**39**	A	**40**	B	**41**	A	**42**	D
43	B	**44**	D	**45**	D	**46**	A	**47**	D	**48**	C	**49**	B
50	B	**51**	C	**52**	A	**53**	C	**54**	C	**55**	B	**56**	C
57	C	**58**	D	**59**	B	**60**	C	**61**	D	**62**	C	**63**	C
64	A	**65**	A										

Explanations:-

1. $Y = A + A'B + A'B'C + A'B'C'D = A + B + C + D$

2. 

3. Number of leaves in a full binary tree =x+1
   $\therefore$ Number of internal nodes = x
   Number of articulation points = Number of internal nodes = x

4. 299 is in right sub-tree of 347.
   (Elements in right sub-tree of 347 cannot be less than 347.)

5. If determinant = 0, vectors are linearly dependent.

6. The equations are inconsistent.

8. Matrices are not necessarily commutative over multiplication.

9. Option (A) does not contain 0 which is accepted by the given DFA.

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11. A relation R on a set A is antisymettric iff
if aRb and bRa then a=b for all a,b $\in$ A
1. for any two sets A and B if $A \subset B$ then $B \not\subset A$ $\therefore$ it is antisymmetric
2. for any pair of real numbers and a and b, $a \le b$ and $b \le a$ only if $a = b$
3. same is the case with "is a factor of" relation
4. $2 \neq 3$ & $3 \neq 2$ but 2 and 3 are not equal $\therefore$ it is antisymmetric.

12. Adjacency list is represented using one linked list for each vertex.

14. ALTER is a DDL command. All DDL are committed automatically.

15. Non deterministic grammars have common prefixes and removal of common prefix is known as left factorization.

17. Swap function is useless as it swaps values of local variables P1 and P2 whose scope is limited.

18. Number of bits $\ge 57\log_2 10 \ge 190$

19. In look through read architecture when a fault occurs, data is first loaded from main memory to cache. Only then CPU can access it.
$0.9 \times 1 + 0.1(0.95 \times 16 + 0.05 \times 316) = 4$ ns

20. (23+35+12+43+15)-5+1=124

21. Efficiency $= \dfrac{1}{1 + \dfrac{2BLe}{cF}}$ Where B = Bandwidth, L = length of cable, F = frame length,
e is the natural log base=2.718, c is speed of light in m/s= 3*10^8

22. Connection oriented communication means, strictly following 3-way handshake while establishing connection and maintaining acknowledgement while sending packets.

24. In computer programming, a 'dry run' is a mental run of a computer program. It is also known as static testing.

25. Total Kloc = 0.5+0.9+0.6+0.8 = 2.8Kloc
Effort = $a(\text{Kloc})^b$ = 9.43 person-month
Time = $c(E)^d$ = 5.86 months

26. It is LR(1). But it gives an RR conflict if we try to merge the following two states:

S1 :	$A \to d., a$	S2 :	$A \to d., c$
	$B \to d., c$		$B \to d., a$

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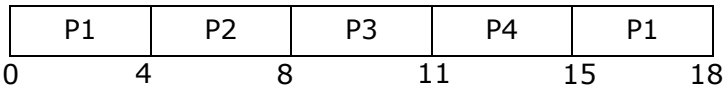
27. 172.17.236.130 and 172.17.236.189 are in the same subnetwork

28. P [neither selected] = $\left(1-\frac{8}{9}\right)\left(1-\frac{5}{8}\right)=\frac{1}{24}$

29. As simpon's rule gives exact value for polynomials whose degree ≤ 3 so the Error = 0

30.



Waiting time for P1 = 0+11=11
Waiting time for P2 = 4
Waiting time for P3 = 8
Waiting time for p4 = 11
Total waiting time = 34
Average waiting time = 34/4 = 8.5 ms
11ms is the maximum Waiting Time, P1 and P4 has waited for 11ms.

31.
- Not all unsafe states are deadlocks.
- In safe state there is some scheduling order in which every process can run to completion even if all of them suddenly request their maximum number of resources.

32. A is false. B is inconsistent. C has a unique solution. D is false as y can be imaginary for some x.

33. $P(X)=a_0+X(a_1+X(a_2+(.....X(a_{n-1}+Xa_n).....)$
so a total of n multiplications. This method is also known as Horner's Rule.

34. Let total nodes = T
Internal nodes = I
And leaves = L
$\therefore T=(3*I)+1$
$\therefore 67=3I+1$
$\therefore I=22$
$L=(2*I)+1=(2*22)+1=45$
$\therefore L=45$

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35. Tag field =11bits
Set field =6 bits
Offset=6 bits
Number of blocks = 4*sets = $4*2\hat{}6$ =256
Space for tag field = 256*11=2816 bits = 352 bytes

36. Device transfers 1 byte in $61\mu s.\ (16kB/s)$
Memory operation transfers 1 Byte in $1\mu s.\ (1MB/s)$.
%CPU idle time = 1/(1+61) = 1.6%

37. 160-(log30+log70+log12+log25+log23)=134.

38. Page fault rate=$\frac{6}{10}$=0.6

39. Only finite lattice has a least and a greatest element.
All well-ordered sets are also totally ordered sets, but not vice- versa.

40. Use Kuratowsk's theorem. 1 has k_5 and 3 has $k_{3,3}$ as subgraphs.

41. $\bar{B}\bar{C}\bar{D}\bar{A}+\bar{B}\bar{C}\bar{D}.O+\bar{B}C\bar{D}.\bar{A}+\bar{B}CD.1+B\bar{C}\bar{D}.O+B\bar{C}D.O+BC\bar{D}.A+BCD.1$
$=\bar{B}\bar{C}\bar{D}\bar{A}+\bar{B}C\bar{D}\bar{A}+\bar{B}CD+BC\bar{D}.A+BCD$
$=CD+ABC+\bar{A}\bar{B}\bar{D}$

42. The sequence generated is : 0-1-3-5-7-1…...

43. There are 25 minterms in the SOP.
Number of NAND gates = Number of minterms + 1 = 25+1=26.

44. Option (A) doen't generate 100.
Correct regular expression is $\in+\left(0+1\left(0+1\left(0+1(0+1)\right)\right)\right)(0+1)^*$

45. Kleene closure of non-regular is not regular.

46. There is a procedure to find given CFL is empty or finite.

47. Candidate keys as well as prime attributes: A, C, E, F

48-49 $\pi_{SName}(T)$ = Name of students taught by some professor.
$S-\pi_{SName}(T)$ = Name of students taught by no professor.

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50-51 $h'(k,i) = \{h(k) + i\} \bmod 9$ where i = 0,1,2,.....

i is incremented after each unsuccessful probe.

52. $2 \times 15 / (0.7 \times 3 \times 10^5)$

53. $1500 \times 8 (143 \times 10^{-6})$

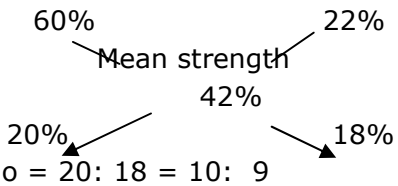
54. We don't know the relative age of the kids. So there are three possible cases: BG, GB, BB. (GG is not possible as we know 1 kid is a boy)
So the other kid is a girl by 2/3 probability.
Had we known that the boy chetan saw was elder (or younger) the probability would have been 1/2.

55. Probability that all of Pranita's kids like cricket is $(1/3)(5/7)(5/7) + (1/3)(5/7)(1/2) + (1/3)(1/2)(5/7) = 20/49$

60. Possible cases:
1st Case: 2 men & 2 women
2nd case: 3 men & 1 women
3rd Case: 4 men only
Required number of ways = $6c_2 \times 5c_2 + 6c_3 \times 5c_1 + 6c_4$

62. Banti is 80% more efficient than Anand
Assume, Anand efficiency is 100 percent
Then, Banti is 180 (100+80) percent efficient
$\therefore$ Ratio of time taken by Anand and Banti = $180:100 = 9:5$
(Reciprocal to efficiencies)
Now, assume Banti takes x days
Given Anand does the job in 14 days
$14 : X :: 9:5 \Rightarrow 9x = 70$
$x = \frac{70}{9} = 7\frac{7}{9}$

63. By the rule of alligation, we have
Strength of first jar Strength of second jar



Ratio = 20: 18 = 10: 9
$\therefore$ Required quantity replaced = $\frac{9}{19}$

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64. $(x^n + 1)$ is divisible by $(x + 1)$, when n is odd

$(87^{65} + 1)$ will be divisible by 88

$(87^{65} + 1) + 86$, when divided by 88 will give 86 as remainder

65. Number of males in U.P = $\left[\frac{3}{5} \text{ of } (15\% \text{ of } N)\right] = \frac{3}{5} \times \frac{15}{100} \times N = \frac{9N}{100}$

Where N = 3276000

Number of males in M.P = $\left[\frac{3}{4} \text{ of } (20\% \text{ of } N)\right] = \frac{3}{4} \times \frac{20}{100} \times N = \frac{15N}{100}$

Number of males in Goa = $\left[\frac{3}{8} \text{ of } (12\% \text{ of } N)\right] = \frac{3}{8} \times \frac{12}{100} \times N = \frac{4.5N}{100}$

Total males in these 3 states = $(9 + 5 + 4.5)\frac{N}{100} = \frac{28.5N}{100}$

Required % = $\left(\frac{28.5 \times \frac{N}{100} \times 100}{N}\right)\% = 28.5\%$

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