

140/2016

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. What reflects the quintessence of the constitution?
(A) Fundamental Rights (B) The Preamble
(C) Directive Principles (D) Fundamental Duties
2. Which are the articles dealing with the Centre-State Relations?
(A) Articles 245 to 263 (B) Articles 200 to 215
(C) Articles 145 to 153 (D) Articles 295 to 313
3. What is the subject matter of articles 346 and 347?
(A) Right to property
(B) Appointment of Judges of High Courts
(C) Official language or languages of a State
(D) Public Service Commission
4. Which article provides a guaranteed remedy for the enforcement of fundamental rights?
(A) Article 32 (B) Article 23
(C) Article 226 (D) Article 14
5. The Central Government has been created the National Green Tribunal on :
(A) 29th November 2010 (B) 24th October 2009
(C) 12th November 2011 (D) 18th October 2010
6. In which year *Samkshepa Vedartham*, the first book in Malayalam was published?
(A) 1872 (B) 1847
(C) 1772 (D) 1782
7. Ayyankali organized the first planned peasant strike in Kerala at Venganoor in :
(A) 1900 (B) 1909
(C) 1910 (D) 1904
8. List out the odd one from the following options :
(A) Sree Narayana Guru (B) Madan Asan
(C) Raman Pillai (D) Vaikunda Swamigal
9. Who authored the work *Ananda Sutra*?
(A) Brahmananda Sivayogi (B) Sree Narayana Guru
(C) Vaikunda Swamigal (D) Ayyankali
10. Who was the martyr of Paliyam Satyagraha?
(A) K. G. Velayudhan (B) A. G Velayudhan
(C) I. C. Chacko (D) Prakash

11. Who wrote the pamphlet *Zau-us-Sabah*?
 (A) Veliyankot Umar Qazi (B) Sayyid Sanaullah Makti Thangal
 (C) Vakkam Moulavi (D) Hamadani Thangal
12. In which years Kumara Guru was nominated to the Sri Mulam popular Assembly?
 (A) 1920 and 1921 (B) 1922 and 1923
 (C) 1921 and 1930 (D) 1921 and 1931
13. What was the name of the Madras Governor, who ordered the Travancore govt. to issue orders for permitting the Channar women to wear jacket and pinafore?
 (A) Lord Huntington (B) Colonel Hitchcock
 (C) Lord Baily (D) Lord Haris
14. The first woman Chief Secretary of Kerala :
 (A) K.O. Aysha Potti (B) K. K. Usha
 (C) Pathma Ramachandran (D) V. S. Ramadevi
15. Who was the founder of Sree Ramadasa Asramam?
 (A) Sree Neelakanda Gurupadar (B) Swami Vivekananda
 (C) Sree Narayana Guru (D) Pazhoor Raman Chennan
16. The founder of *Sabari Asram* in Palakkad?
 (A) Kumaran Asan (B) Ananda Shenoy
 (C) T. R. Krishnaswamy (D) Pandit Karuppan
17. The first female Prime Minister of Greece?
 (A) Alexis Tsipras (B) Vassiliki Thanou
 (C) Neela Vaswani (D) Svetlana Alexievich
18. Who won the 'Global Indian of the Year' award?
 (A) Narendra Modi (B) Sachin Tendulkar
 (C) Aravind Kejrival (D) Aishwarya Rai Bachchan
19. Who won the Nobel Prize 2015 in Economics?
 (A) Carli Lloyd (B) Angus Deaton
 (C) Nadine Kefler (D) Aziz Sanca
20. Who won the 'Man of the Match' award in the final match of the ICC World Twenty 20 in 2016?
 (A) M. Samuels (B) D. Bravo
 (C) C. Gale (D) A. Russel
21. If 1, 2, 3 are the eigen values of a matrix A , then the eigen values of $[A - 4I]^2$ are :
 (A) -7, -12, -15 (B) 10, 4, 1
 (C) 9, 4, 1 (D) 4, 4, 2

22. The value of the integral $\int_0^{\infty} \frac{e^{-2t} \sin^2 t}{t}$ is :
- (A) $\frac{\ln 5}{4}$ (B) $\frac{\ln 2}{4}$
 (C) $\frac{\ln 2}{2}$ (D) $\frac{1}{4}$
23. The homogeneous linear differential equation if its solutions are e^{2x} , xe^{2x} , x^2e^{2x} is :
 $y''' + Ay'' + By' - 8y = 0$ where A and B are
 (A) 6, -12 (B) -6, 12
 (C) 6, 12 (D) 2, 2
24. The following is not a simple pole of the function $\frac{\cot \pi z}{(z - 0.75)^2}$:
- (A) 0.75 (B) 0
 (C) -1 (D) 20
25. The coefficient a_n in the Fourier cosine series expansion of the function $f(x) = (x - 1)^2$ in the interval $0 < x < 1$ is :
- (A) $\frac{-4}{n^2\pi^2}$ (B) $\frac{-2}{n^2\pi^2}$
 (C) $\frac{2}{n^2\pi^2}$ (D) $\frac{4}{n^2\pi^2}$
26. Centre of gravity of a right circular cone of base radius r and height h from the base is :
- (A) $\frac{3}{4}h$ (B) $\frac{1}{4}h$
 (C) $\frac{3}{8}h$ (D) $\frac{1}{8}h$
27. What is the maximum weight that can be lowered by a person who can exert a 500 N pull on a rope if the rope is wrapped $2\frac{1}{2}$ turns around a horizontal spur? Coefficient of friction between spur and rope is 0.3 :
- (A) 4.5 N (B) 45 N
 (C) 556.59 N (D) 55659 N
28. What is the length of a Surveyors chain?
 (A) 33 ft (B) 66 ft
 (C) 33 m (D) 66 m
29. R.L of a factory floor is 100.00. Staff reading on the floor is 5.62 ft. and the staff reading when the staff is held inverted with bottom touching the tie beam of the roof truss is 10.16 ft. What is the height of the tie beam above the floor?
 (A) 15.78 ft (B) 115.78 ft
 (C) 4.54 ft (D) 104.54 ft

30. The horizontal distance between the vertical joints in successive courses in brick work is called :
- (A) Perpend (B) Lap
(C) Arries (D) Closer
31. Knocking in a spark ignition engine is promoted by :
- (A) a short flame travel length
(B) normally at the beginning of the combustion process
(C) increased clearance volume of cylinder
(D) reduced turbulence of the fuel-air mixture during combustion
32. Centrifugal pumps operating in series will result in :
- (A) Higher discharge (B) Reduced power consumption
(C) Higher head (D) Low speed operation
33. A good refrigerant should have :
- (A) High COP and high freezing point
(B) High operating pressures and low freezing point
(C) High latent heat of vaporization and low freezing point
(D) High specific volume and high latent heat of vaporization
34. In sheet metal blanking, shear is provided on punches and dies so that :
- (A) press load is reduced (B) good cut edge is obtained
(C) warping of sheet is minimised (D) cut blanks are straight
35. A curve generated by a fixed point on the circumference of a circle which rolls without slipping on the outer side of a fixed circle is known as :
- (A) Hypocycloid (B) Epicycloid
(C) Involute (D) Cycloid
36. Direction of dynamically induced EMF can be found by :
- (A) Maxwell's cork screw rule (B) Flemings Right Hand rule
(C) Flemings Left Hand rule (D) Coulomb's law
37. Form factor of sinusoidally varying alternating current is :
- (A) 1.414 (B) 1.11
(C) 1.21 (D) 2.11
38. In a Delta connected three phase supply system phase current is given by :
- (A) $\sqrt{3}$ times line current (B) line current
(C) $\frac{1}{\sqrt{2}}$ times line current (D) $\frac{1}{\sqrt{3}}$ times line current
39. Earth wire is usually connected to _____ part of the electric heater.
- (A) Metallic body (B) Phase point
(C) Neutral point (D) Heating coil

40. Which of the following DC Motor gives highest No-load speed?
 (A) Shunt motor (B) Cumulatively compound motor
 (C) Series motor (D) Differentially compound motor
41. The BJT used in an oscillator circuit is biased in _____ region.
 (A) Active (B) Cut-off
 (C) Saturation (D) None of these
42. The ripple factor of a capacitor filter 'C' connected to the output of a full-wave rectifier with input line frequency 'f' Hz and load resistance ' R_L ' is :
 (A) $\frac{1}{2\sqrt{3}fR_L C}$ (B) $\frac{1}{4\sqrt{3}fR_L C}$
 (C) $\frac{1}{2\pi fR_L C}$ (D) $\frac{1}{2\sqrt{2}fR_L C}$
43. The bandwidth of wide band frequency modulated wave as per Carson's rule is :
 (A) $B_T \approx 2(D + 2)W$ (B) $B_T \approx (2D + 1)W$
 (C) $B_T \approx 2(D + 1)W$ (D) None of these
 where D is the deviation ratio and W is the message signal bandwidth.
44. For a voltage shunt negative feedback amplifier using operational amplifier, select the TRUE statement :
 (A) Input impedance decreases and output impedance decreases
 (B) Input impedance increases and output impedance increases
 (C) Input impedance increases and output impedance decreases
 (D) Input impedance decreases and output impedance increases
45. The type of negative feedback introduced in the Common Emitter amplifier using voltage divider bias network when the bypass capacitor is removed :
 (A) Current shunt (B) Voltage shunt
 (C) Voltage series (D) Current series
46. The CPU gets the address of the next instruction to be executed from the :
 (A) Instruction Register (B) Memory Address Register
 (C) Program Counter (D) Accumulator
47. What is the value of b at the end of execution of the following C program?

```

int add(int a)
{
    static int count = 0;
    count = count + a;
    return (count);
}
main()
{
    int a, b;
    for (a = 0; a <= 4; a++)
        b = add(a);
}

```

 (A) 10 (B) 12
 (C) 4 (D) 6

48. What will be the output of the following C program segment?

```
int n = 1;
switch (n)
{
case 1 :    printf (" One");
case 2 :    printf ("Two");
case 3 :
case 4 :
case 5 :
default :   printf("Wrong Choice");
}
```

- (A) One (B) One Two Wrong Choice
(C) Two (D) One Two

49. The default parameter passing mechanism of functions is :

- (A) Call by value (B) Call by reference
(C) Call by result (D) None of the above

50. What is the output of this C code?

```
#include<stdio.h>
int main()
{
do
printf("Inside while loop");
while(0);
printf("After while loop");
}
```

- (A) Infinite loop
(B) Compilation error
(C) After while loop
(D) Inside while loop After while loop

51. To implement a 2 input EXCLUSIVE OR function, the minimum number of NAND gates required is (use NAND gates only) :

- (A) 3 (B) 4
(C) 5 (D) 6

52. The number $(A72E)_{16}$ is equivalent to :

- (A) $(123456)_8$ and $(22130232)_4$ (B) $(132456)_8$ and $(22130232)_4$
(C) $(123456)_8$ and $(22131122)_4$ (D) $(123546)_8$ and $(22120232)_4$

53. Which of the following DMA transfer modes and interrupt handling mechanisms will enable the highest I/O bandwidth?

- (A) Transparent DMA and polling interrupts
(B) Cycle-stealing and vectored interrupts
(C) Block transfer and vectored interrupts
(D) Block transfer and polling interrupts

54. Which of the following statements is FALSE about relative addressing mode?
(A) It enables reduced instruction size
(B) It allows indexing of array elements with same instruction
(C) It enables easy relocation of data
(D) It enables faster address calculations than absolute addressing
55. The TRAP interrupt mechanism of the 8085 microprocessor :
(A) Executes an instruction supplied by an external device through the INTA signal
(B) Executes an instruction from memory location 20H
(C) Executes a NOP
(D) None of the above
56. Which of the following objects can be used in expressions and scriptlets in JSP (Java Server Pages) Without explicitly declaring them?
(A) Session and request only
(B) Request and response only
(C) Response and session only
(D) Session, request and response
57. The address bus of 8086 CPU is :
(A) 10 bits
(B) 20 bits
(C) 24 bits
(D) 36 bits
58. The register which keeps track of the execution of a program and which contains the memory address of the instruction currently being executed is called :
(A) Index register
(B) Memory address register
(C) Program counter
(D) Instruction register
59. The register used as a working area in CPU is :
(A) Program counter
(B) Instruction register
(C) Instruction decoder
(D) Accumulator
60. In the absolute addressing mode :
(A) Operand is inside the instruction
(B) Address of the operand is inside the instruction
(C) Register containing the address of the operand is specified inside the instruction
(D) Location of the operand is implicit
61. In a software project, COCOMO (Constructive Cost Model) is used to estimate
(A) effort and duration based on the size of the software
(B) size and duration based on the effort of the software
(C) effort and cost based on the duration of the software
(D) size, effort and duration based on the cost of the software
62. A relation EMPLOYEE is defined with attributes empcode (unique), name, street, city, state and pin code. For any pin code, there is only one city and state. Also, for any given street, city and state, there is just one pin code. In normalization terms, EMPLOYEE is a relation in :
(A) 1 NF only
(B) 2 NF and hence also in 1 NF
(C) BCNF and hence also in 3NF, 2NF and 1NF
(D) 3NF and hence also in 2NF and 1NF

63. A software configuration management tool helps in :
- (A) Keeping track of the schedule based on the milestone reached
 - (B) Maintaining different versions of the configurable items
 - (C) Managing manpower distribution by changing the project structure
 - (D) None of the above
64. A relational database contains two tables employee and department in which employee table has columns emp-no, name and dept-id and department table has columns dept-id and dept-name. The following insert statement were executed successfully to populate the empty tables :
- Insert into department values (1, 'computer science')
- Insert into department values (2, 'information technology')
- Insert into employee values (1, 'Navin', 1)
- Insert into employee values (2, 'Mukesh', 2)
- Insert into employee values (3, 'Suresh', 1)
- How many rows and columns will be retrieved by the following SQL statement?
- Select * from employee, department
- (A) 0 row and 4 columns
 - (B) 3 rows and 4 columns
 - (C) 3 rows and 5 columns
 - (D) 6 rows and 5 columns
65. A table has fields F1, F2, F3, F4, F5 with the following functional dependencies $F1 \rightarrow F3$, $F2 \rightarrow F4$, $(F1, F2) \rightarrow F5$ in terms of normalization, this table is in :
- (A) 1NF
 - (B) 3NF
 - (C) 2NF
 - (D) None of these
66. A B-tree used as an index for a large database table has four levels including the root node. If a new key is inserted in this index ,then the maximum number of nodes that could be newly created in the process are :
- (A) 5
 - (B) 4
 - (C) 3
 - (D) 2
67. Amongst the ACID properties of a transaction, the 'durability' property requires that the changes made to the database by a successful transaction persist :
- (A) Except in case of an operating system crash
 - (B) Except in case of a disk crash
 - (C) Except in case of a power failure
 - (D) Always, even if there is a failure of any kind
68. Consider a relation R with five attributes V, W, X, Y and Z. The following functional dependencies hold : $VY \rightarrow W$, $WX \rightarrow Z$ and $ZY \rightarrow V$. Which of the following is a candidate key for R?
- (A) VXZ
 - (B) VXY
 - (C) VWXY
 - (D) VWXYZ

69. Which of the following is a realization of polymorphism?
 (A) Operator overloading (B) Function overloading
 (C) Dynamic binding (D) All of these
70. A major advantage of inheritance is :
 (A) Reducing the time it takes to create new objects
 (B) Not having to think about how objects will be used
 (C) Reducing the amount of memory required to execute a program
 (D) Enabling people to create useful applications
71. The technique used to summarize the financial, statistical, mathematical, scientific and economic data is :
 (A) Computer Art (B) Image processing
 (C) Presentation Graphics (D) None of the above
72. Graphics and image processing technique used to produce a transformation of one object into another is called :
 (A) Animation (B) Morphing
 (C) Half toning (D) None of the above
73. In a binary tree, for every node the difference between the number of nodes in the left and right subtrees is at most 2. If the height of the tree is $h > 0$, then the minimum number of nodes in the tree is :
 (A) 2^{h-1} (B) $2^{h-1} + 1$
 (C) $2^h - 1$ (D) 2^h
74. A binary search tree contains the numbers 1, 2, 3, 4, 5, 6, 7, 8. When the tree is traversed in pre-order and the values in each node printed out, the sequence of values obtained is 5, 3, 1, 2, 4, 6, 8, 7. If the tree is traversed in post-order, the sequence obtained would be :
 (A) 8, 7, 6, 5, 4, 3, 2, 1 (B) 1, 2, 3, 4, 8, 7, 6, 5
 (C) 2, 1, 4, 3, 6, 7, 8, 5 (D) 2, 1, 4, 3, 7, 8, 6, 5
75. Let G be a weighted undirected graph and e be an edge with maximum weight in G . suppose there is a minimum weight spanning tree in G containing the edge e . which of the following statements is always true?
 (A) There exists a cutset in G having all edges of maximum weight
 (B) There exists a cycle in G having all edges of maximum weight
 (C) Edge e cannot be contained in a cycle
 (D) All edges in G have the same weight
76. Let P be a singly linked list. Let Q be the pointer to an intermediate node X in the list. What is the worst case time complexity of the best known algorithm to delete the node X from the list?
 (A) $O(n)$ (B) $O(\log^2 n)$
 (C) $O(\log n)$ (D) $O(1)$

77. A problem in NP is NP complete if
- Some problem in NP can be reduced to it in polynomial time
 - The 3-SAT problem can be reduced to it in polynomial time
 - It can be reduced to any other problem in NP in polynomial time
 - It can be reduced to the 3SAT problem in polynomial time
78. The maximum number of edges in an acyclic undirected graph with n vertices is :
- $n - 1$
 - $n + 1$
 - n
 - $2n - 1$
79. In a binary tree, the number of internal nodes of degree 1 is 5 and the number of internal nodes of degree 2 is 10. The number of leaf nodes in the binary tree is :
- 15
 - 11
 - 12
 - 10
80. Which of the following sequences of array elements forms a heap?
- [23, 17, 14, 6, 13, 10, 1, 12, 7, 5]
 - [23, 17, 14, 6, 13, 10, 1, 5, 7, 12]
 - [23, 17, 14, 7, 13, 10, 1, 5, 6, 12]
 - [23, 17, 14, 7, 13, 10, 1, 12, 5, 7]
81. The binary relation $r = \{(1, 1), (2, 1), (2, 2), (2, 3), (2, 4), (3, 1), (3, 2), (3, 3), (3, 4)\}$ on the set $A = \{1, 2, 3, 4\}$ is :
- Reflexive, symmetric and transitive
 - Neither reflexive, nor irreflexive but transitive
 - Irreflexive and antisymmetric
 - Irreflexive, symmetric and transitive
82. In a room containing 28 people, there are 18 people who speak English, 15 people who speak Hindi and 22 people who speak Kannada, 9 persons speak both English and Hindi, 11 persons speak both Hindi and Kannada where as 13 persons speak both Kannada and English. How many people speak all the three languages?
- 6
 - 7
 - 8
 - 9
83. Which one of the following regular expressions is NOT equivalent to the regular expression $((ab)^* + c^*)^*$?
- $(a^* + b^* + c^*)^*$
 - $(a^*b^*c^*)^*$
 - $(a + b + c)^*$
 - $(a^*b^* + c^*)^*$
84. Which of the following statements is TRUE about the regular expression 01^*0 ?
- It represents a finite set of finite strings
 - It represents an infinite set of finite strings
 - It represents an infinite set of infinite strings
 - It represents a finite set of infinite strings
85. Let L be a context free language and M a regular language. Then the language $L \cap M$ is :
- Always regular
 - Always a deterministic context free language
 - Never regular
 - Always a context free language

86. Consider a fully associative cache with 8 cache blocks (numbered 0-7) and the following sequence of memory block requests : 4, 3, 25, 8, 19, 6, 25, 8, 16, 35, 45, 22, 8, 3, 16, 25, 7 if LRU replacement policy is used ,which cache block will have memory block 7?
- (A) 4 (B) 5
(C) 6 (D) 7
87. Two shared resources R_1 and R_2 are used by processes P_1 and P_2 . Each process has a certain priority for accessing each resource. Let T_{ij} denote the priority of P_i for accessing R_j . A process P_i can snatch a resource R_k from process P_j if T_{ik} is greater than T_{jk} . Given the following :
- I $T_{11} > T_{21}$
 II $T_{12} > T_{22}$
 III $T_{11} < T_{21}$
 IV $T_{12} < T_{22}$
- Which of the following conditions ensures that P_1 and P_2 can never deadlock?
- (A) I and IV (B) II and III
(C) I and II (D) None of the above
88. Dijkstra's banking algorithm in an OS, solves the problem of :
- (A) Deadlock avoidance (B) Deadlock recovery
(C) Mutual exclusion (D) Context switching
89. In real-time OS, which of the following is the most suitable scheduling scheme?
- (A) Round Robin (B) First Come First Serve
(C) Preemptive (D) Random Scheduling
90. A linker :
- (A) Is not necessary with variable partitions (B) Must be run after the loader
(C) Creates a load module (D) Is not needed with a good compiler
91. A firewall :
- (A) Is a computer or router that sits between the trusted and untrusted
(B) It limits network access between the two security domains, maintains and logs all connections
(C) A firewall may need to allow http to pass
(D) All of these
92. A sender is employing public key cryptography to send a secret message to a receiver. Which one of the following statements is TRUE?
- (A) Sender encrypts using receivers public key
(B) Sender encrypts using his own public key
(C) Receiver decrypts using senders public key
(D) Receiver decrypts using his own public key

93. A host is connected to a department network which is part of a university network. The university network in turn, is part of the Internet. The largest network in which the Ethernet address of the host is unique is :
- (A) The subnet to which the host belongs (B) The department network
(C) The university network (D) The internet
94. In a TCP/IP protocol suite, which one of the following is NOT part of the IP header?
- (A) Fragment Offset (B) Destination IP Address
(C) Source IP Address (D) Destination port number
95. Count to infinity is a problem associated with :
- (A) Link state routing protocol (B) Distance vector routing protocol
(C) DNS while resolving host name (D) TCP for congestion control
96. Which of the following statements is TRUE about CSMA/CD?
- (A) IEEE802.11 wireless LAN runs CSMA/CD protocol
(B) Ethernet is not based on CSMA/CD protocol
(C) CSMA/CD is not suitable for a high propagation delay network like satellite network
(D) There is no contention in a CSMA/CD network
97. HELO and PORT, respectively are commands from the protocols :
- (A) FTP and HTTP (B) TELNET and POP3
(C) HTTP and TELNET (D) SMTP and FTP
98. A firewall is to be configured to allow hosts in a private network to freely open TCP connections and send packets on open connections. However, it will only allow external hosts to send packets on existing open TCP connections or connections that are being opened (by internal hosts) but not allow them to open TCP connections to hosts in the private network. To achieve this the minimum capability of the firewall should be that of :
- (A) A combinational circuit
(B) A push down automaton with two stacks
(C) A finite automaton
(D) A push down automaton with one stacks
99. In TCP, a unique sequence number is assigned to each :
- (A) Byte (B) Message
(C) Word (D) Segment
100. What is XML?
- (A) Superset of SGML, Extendable Markup Language
(B) Subset of SGML, Extensible Markup Language
(C) Like SGML, Extended Markup Language
(D) None of these