TEST SERIES UGC-NET/JRF JULY 2018

BOOKLET SERIES E

Paper Code 87

Test Type: *TEST SERIES*

COMPUTER SCIENCE & APPLICATIONS

Duration: 03:10 Hours

Date: 03-07-2018
Maximum Marks: 300

Read the following instructions carefully:

1. Single Paper Test is divided into **TWO** Parts.

2. **Paper - I:** This part shall carry **50** questions. Each question shall be of **2 marks.**

3. **Paper - II:** This part shall contain **100** questions. Each question shall be of **2 marks**.

4. There will be no negative marking.

5. Darken the appropriate bubbles with HB pencil/Ball Pen to write your answer.

6. The candidates shall be allowed to carry the Question Paper Booklet after completion of the exam.

CAREER ENDEAVOUR
Best Institute for IIT-JAM, NET & GATE

PAPER-I

1. Which of the following situations would the best for maximum transfer of learning?
   (a) Different tasks requiring different responses
   (b) Different tasks requiring the same response
   (c) Similar tasks requiring different responses
   (d) Similar tasks requiring the same response

2. Which one of the following is the most important elements in teaching?
   (a) Relationship between teachers and students   (b) Subject matter
   (c) Teaching techniques and aids used   (d) Student's knowledge

3. If you want to improve the ability to observe in children, which of the following would you recommend?
   (a) Generating interest in subject
   (b) Developing a framework for experiences
   (c) Sharpening the senses
   (d) Training mental faculties

4. If a test measures exactly what it is supposed to measure, the test is exhibiting the property of
   (a) Objectivity   (b) Validity   (c) Reliability   (d) Discrimination

5. The teacher who can apply the principles of Educational Psychology
   (a) Has pride in the teaching profession
   (b) Can provide readymade solutions
   (c) Adjusts his method to suit the needs of individual children
   (d) Compares the theories of learning

6. In which of the following sampling techniques every element of the population has an equal, nonzero probability of being selected in a sample,
   (a) Probability sampling   (b) Convenience sampling
   (c) Purposive sampling   (d) Quota sampling

7. Which is the odd one out?
   Modern qualitative research can generally involve a detailed study of:
   (a) psychological characteristics of interesting individuals.
   (b) conversational exchanges between people and interviews.
   (c) media content.
   (d) text.

8. If you find that someone else publishes work similar to yours before your project is completed, what could you do?
   (a) Change your hypotheses and aims.
   (b) There is nothing you can do so do not mention it in your study.
   (c) Completely revamp your ideas so you are not replicating their study.
   (d) Acknowledge it in your report and evaluate the study.

9. Which of the following is incorrect?
   (a) Studies using non-manipulation designs generally involve testing fewer cases than true experiments because the size of the effects is expected to be stronger.
   (b) The cross-sectional design can be as difficult to perform as the laboratory experiment both in terms of fieldwork and effective statistical analysis of the data.
   (c) Non-manipulation designs are used to determine the size of the association between variables as they occur naturally.
   (d) Variables in cross-sectional deigns often have one variable as a criterion variable, or dependent variable, and other variables as predictor or independent variables.

10. Citation means that a particular paper has been:
(a) sold to another publisher.
(b) discussed orally by another author.
(c) quoted in another paper by another author.
(d) reproduced elsewhere.

11. If communicated meanings are different, the communication process has suffered some kind of _____, and the result is limited _____.
(a) misdirection, appeal   (b) damage, injury
(c) disconnect, viability   (d) distortion, accuracy

12. Although supplementing the meanings of our verbal messages may be the most obvious use of nonverbal behavior, one of the most subtle is in _____ our conversations.
(a) regulating   (b) limiting   (c) encouraging   (d) discontinuing

13. Our listening activities serve at least four primary purposes, including:
(a) just for recreation, to evaluate information, and because it is required.
(b) to acquire information, just for recreation, and to evaluate and screen information.
(c) to evaluate and screen information, for competence in dealing with others, and to create appropriate responses.
(d) because it is required, for communication competence, and for social efficacy.

14. A major trend in newspaper circulation is that on a per capita basis, newspaper use is now _____.
(a) more important than ever.   (b) more influential than in the past.
(c) increasing.   (d) declining.

15. A _____ is similar to a letter in that it is a written document sent to one of more receivers.
(a) memorandum   (b) telegram   (c) medium   (d) transfer

16. The Constitution establishes the parliamentary system not only at the Centre but also in the states. Which of the following is/are the major features of parliamentary government in India?
Sovereignty of the Indian Parliament
Collective responsibility of the executive to the legislature and Judiciary
Membership of the ministers in the legislature
Presence of nominal and real executives
Resolution of all Parliamentary disputes by the Judiciary
Select the correct answer using the codes below.
(a) 1, 2 and 4 only   (b) 2, 3 and 4 only   (c) 3 and 5 only   (d) 1, 2, 3, 4 and 5

17. What do you understand by the statement, "The Directive principles of State Policy (DPSP) in the constitution are non-justiciable in nature"?
(a) The courts cannot recognize the DPSP in their judgments.
(b) DPSP cannot be enforced by law.
(c) They are not enforceable by the courts for their violation.
(d) All of (a), (b) and (c)

18. On a question whether a member of parliament (MP) is subject to any of the disqualification under Representation of People's Act, 1951 whose decision is final?
(a) President   (b) High Court
(c) Supreme Court   (d) Election Commission of India

19. Suppose the Lok Sabha has been adjourned by the speaker. Then which of the following would take place
1. all pending notices would lapse.
2. a bill pending in loksabha lapses.
3. a bill passed by both houses but pending assent by president does not lapse
Select the correct answer using the codes given below.
(a) 1 and 2 only   (b) 1 and 3 only   (c) 2 and 3 only   (d) None

20. The constitution of India establishes a federal system of government. This can be seen from :
    1. rigidity of constitution   2. single citizenship
    3. all-India services   4. supremacy of constitution
    Select the correct answer using the codes given below.
    (a) 1 and 2 only   (b) 1 and 3 only   (c) 2 and 3 only   (d) 1 and 4 only

21. The green house gases, includes
    (a) Carbon dioxide   (b) CH_4 (c) N_2O (d) All of these

22. Algal bloom is a results of
    (a) Global warming   (b) Salination   (c) Eutrophication   (d) Biomagnification

23. A high Biological Oxygen Demand (BOD) indicates that:
    (a) water is pure   (b) absence of microbial action
    (c) Low level of microbial pollution   (d) High level of microbial pollution

24. The effects of radioactive pollutants depends upon
    (a) Rate of diffusion   (b) energy releasing capacity
    (c) rate of deposition of the contaminant   (d) all of these

25. Consider the following Statements regarding Endosulfan:
    1. Endosulfan is the most toxic pesticide used on crops like cotton, fruits, tea, paddy, cashew, tobacco etc. for control of pests.
    2. A global ban on the manufacture and use of endosulfan was negotiated under the Stockholm Convention on Persistent Organic Pollutants in April 2011.
    3. In India, Supreme Court in 2011 banned the use, sale, production & export of endosulfan.
    Identify the correct statements:
    (a) 1 & 3 only   (b) 2 & 3 only   (c) All are correct   (d) 1 only

Direction (Q.26-30): Study the following bar graph and answer the questions

Foreign exchange reserves of a country (in million US $)

26. The foreign exchange reserves in 1997-98 was how many times that in 1994-95
    (a) 1.5   (b) 2   (c) 3.5   (d) 2.6

27. What was the percentage increase in the foreign exchange reserves in 1997-98 over 1993-94 ?
    (a) 80%   (b) 90%   (c) 100%   (d) 110%

28. For which year, the percent increase of foreign exchange reserves over the previous year is the highest?
    (a) 1994-95   (b) 1995-96   (c) 1998-99   (d) 1992-93

29. The foreign exchange reserves in 1996-97 were approximately what percent of the average foreign exchange reserves over the period under review ?
    (a) 80%   (b) 100%   (c) 125%   (d) 130%

30. The ratio of the number of years, in which the foreign exchange reserves are above the average reserves, to those in which the reserves are below the average is:
    (a) 3:5   (b) 2:3   (c) 4:7   (d) 3:7

Directions: Read the following passage carefully and give the answers :

What are the good parts of our civilization ? First and foremost there are order and safety. If today I have a quarrel with another man, I do not get beaten merely because I am physically weaker and he can kick me down. I go to law, and the law will decide as fairly as it can between the two of us. Thus in disputes between man and man right has taken the place of might. Moreover, the law protects me from robbery and violence. Nobody may come and break into my house, steal my goods or run off with my children. Of course, there are burglars, but they are very rare, and the law punishes them whenever it catches them.

It is difficult for us to realize how much this safety means. Without safety these higher acti-vities of mankind which make up civilization could not go on. The inventor could not invent, the scientist find out or the artist make beautiful things. Hence, order and safety, although they are not themselves civilization are things without which civilization would be impossible. They are as necessary to our civilization as the air we breathe is to us; and we have grown so used to them that we do not notice them any more than we notice the air.
Another great achievement of our civilization is that today civilized men are largely free from the fear of pain. They still fall ill, but illness is no longer the terrible thing it used to be.... Not only do men and women enjoy better health; they live longer than they ever did before, and they have a much better chance of growing up.... Thirdly, our civilization is more secure than any that have gone before it. This is because it is much more widely spread.... Previous civilizations were specialized and limited, they were like oases in a desert.

31. The third merit of the present civilization, according to the author, is:
    (a) The present civilization is founded on justice
    (b) The present civilization has liberal outlook on life
    (c) The present civilization has provided more leisure
    (d) The present civilization is more wide spread in the sense that large number of people are civilized now than ever before.

32. What according to the author, is the second merit of the present civilization?
    (a) Development of means of transport and communication
    (b) Space research
    (c) Freedom from drudgery
    (d) Mental enlightenment of the people

33. "They were like oases in a desert" what does it mean ?
    (a) Previous civilizations were more attractive than the present civilization
    (b) Previous civilizations were confined to a very limited area while barbarians were far larger in number
    (c) Previous civilizations were attractive from outside only
    (d) Previous civilizations were nature based

34. The most appropriate title to the above passage may be:
    (a) The merits of the Previous Civilizations
    (b) The Defects of the Present Civilizations
    (c) Merits and Demerits of the Present Civilizations
    (d) The Limitations of the Previous Civilizations

35. The present civilization
    (a) Begins from 15th century   (b) Begins from 16th century
    (c) Begins from 17th century   (d) Has no fixed date for its inception

36. The letter skipped in between the adjacent letters in the series are followed by equal space. Which of the following series observe this rule?
    (a) HKNGSW   (b) EIMQCZ   (c) SUXADF   (d) RVZDHL

37. Which number should come in place of the question mark in the following series?
    7, 13, 23, 29, ?, 45
    (a) 39   (b) 32   (c) 40   (d) 42

38. Spinster is related to bachelor in the same way as lass is related to
    (a) Calf   (b) Lad   (c) Male child   (d) None of these

39. In a certain code language INACTIVE is written as VITCANIE. How will COMPUTER be written in that code language?
    (a) UTEMPOCR   (b) MUCPETUR   (c) ETUPMOCR   (d) PMOCRETU

40. Vishnu ranks 16th from the top and 49th from the bottom in a class. How many students are there in the class?
    (a) 66   (b) 65   (c) 64   (d) cannot be determined

41. Two dices are thrown simultaneously the probability of obtaining total score of 8 is
    (a) 5/36   (b) 1/6   (c) 1/9   (d) 7/36

Direction (42-43): Study the following statement and mark you answer
(a) If statement I is cause and statement II is effect
(b) If statement II is cause and statement I is effect
(c) If both the statement are independent
(d) If both the statement I and II are effect

42. **Statement I:** All airlines companies in India has increased the air fares on all routes with immediate effect.
    Statement II: There has been substantial reduction in aviation fuel prices in India during the past few weak.

43. **Statement I:** There has been continuous increase in average temperature during writer in many parts of the country over the past few year.
    Statement II: There has been significant changes in the wind pattern across the country over the last few years?

44. Pointing to a girl in photograph. Amar said, "Her mother's brother is the only son of my mothers's father." How the girl's mother related to Amar ?
    (a) Mother   (b) Sister   (c) Aunt   (d) Grandmothe

45. If a person travels in Car at speed of 60 kmph, he reaches office one hour late. If he travels at a speed of 80 kmph, he reaches one hour early. Find the speed at which he must travel to reach office one time.
    (a) 68.57 kmph   (b) 78 kmph   (c) 63 kmph   (d) 53.8 kmph

46. Random Access Memory (RAM) is which storage of device?
    (a) Primary   (b) Secondary   (c) Tertiary   (d) Off line

47. What is full form of CMOS?
    (a) Content Metal Oxide Semiconductor
    (b) Complementary Metal Oxide Semiconductor
    (c) Complementary Metal Oxygen Semiconductor
    (d) Complementary Metal Oscilator Semiconductor

48. Second generation of computers consist of which of following?
    (a) Vaccum Tubes   (b) Diodes
    (c) VLSI Microprocessor   (d) Transistors

49. MPG is an file extension of which type of files ?
    (a) Audio   (b) Image   (c) Video   (d) Flash

50. What is full form of SMPS ?
    (a) Switch Mode Power Supply   (b) Simple Mode Power Supply
    (c) Storage Mode Power Supply   (d) Storage Mode Power Shortage

PAPER – II

1. The third bit plane corresponding to the image $\begin{bmatrix} 4 & 3 \\ 5 & 2 \end{bmatrix}$ is

   (a) $\begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix}$

2. If the fourier transform of an image f(m, n) is F(k, 1) and the fourier transform of kernel g(m, n) is G(k, 1) then the fourier transform of 4f(m, n) + 5g (m, n) is
   (a) F(4k, 41) + G(5k + 51)
   (b) 20 F(k, 1) G(k,1)
   (c) 4F(k, 1) + 5G(k + 1)
   (d) None of these

3. If D_0 is the cut-off frequency and n is the order of filter then what is the 2D transform function for High-pass Butterworth High pass filter?

   (a) $H(k,1) = \dfrac{1}{1 + \left[\dfrac{D_0}{\sqrt{k^2 + l^2}}\right]^{2n}}$

   (b) $H(k,1) = \dfrac{1}{1 + \left[\dfrac{D_0}{\sqrt{k^2 - l^2}}\right]^{2n}}$

   (c) $H(k,1) = \dfrac{D_0}{D_0 - \left[\dfrac{D_0}{\sqrt{k^2 + l^2}}\right]^{2n}}$

   (d) $H(k,1) = \dfrac{D_0}{D_0 + \left[\dfrac{D_0}{\sqrt{k^2 + l^2}}\right]^{2n}}$

4. _____ provides total solution to reduce data redundancy, inconsistency, dependence and unauthorized access of data.
   (a) DBMS (b) Tables (c) Data base (d) None of these

5. A five symbol alphabet has following probabilities $P(a_1) = 0.1$, $P(a_2) = .30$, $P(a_3) = .25$, $P(a_4) = .15$, and $P(a_5) = .20$. The following codes assigned to the symbols $a_1 = 111$, $a_2 = 0$, $a_3 = 1$, $a_4 = 001$ and $a_5 = 10$. The average code word length for this is ?
   (a) 1.7 (b) 2 (c) 1.8 (d) 1.0

6. Let T be an AVL tree of height 10. What is the largest number of entries it can store?
   (a) $2^{10} - 1$ (b) $2^{11} - 1$ (c) $2^{10} + 1$ (d) $2^{11} + 1$

7. Let H be a heap storing 16 entries. Which of the following statements is true?
   (a) The shortest path in the heap is 3 and the longest path in the heap is 5.
   (b) The shortest path in the heap is 3 and longest path in the heap is 3.
   (c) The shortest path in the heap is 2 and the longest path in the heap is 4.
   (d) The shortest path in the heap is 3 and the longest path in the heap is 4.

8. If we have a pixel grid of n × n pixel grid, where each pixel can take m intensity levels, how many overall intensity levels are possible?
   (a) n × n × (m −1) + 1 (b) n × n × m (c) n × n × (m −1) (d) n × n × (m −1) − 1

9. Which raster location would be chosen by Bresenham's algorithm when scan converting a line from pixel coordiante (1, 1) to pixel coordinate (8, 5)
   (a) (1, 1), (2, 2), (3, 2), (4, 3), (5, 4), (6, 4), (7, 4), (8, 5)
   (b) (1, 1), (2, 2), (3, 2), (4, 4), (5, 4), (6, 4), (7, 4), (8, 5)
   (c) (1, 1), (2, 2), (3, 2), (4, 3), (5, 3), (6, 4), (7, 4), (8, 5)
   (d) (1, 1), (2, 3), (3, 3), (4, 3), (5, 3), (6, 4), (7, 4), (8, 5)

10. Find the normalized transformation which uses a circle of radius 5 units and center (1, 1) as a window and a circle of radius $\frac{1}{2}$ and centre $\left(\frac{1}{2}, \frac{1}{2}\right)$ as a view port.

(a) $\begin{bmatrix} \frac{1}{10} & 0 & 0 \\ 0 & \frac{1}{10} & 0 \\ \frac{2}{5} & \frac{2}{5} & 1 \end{bmatrix}$
(b) $\begin{bmatrix} \frac{1}{10} & 0 & \frac{1}{10} \\ 0 & \frac{1}{10} & 0 \\ \frac{2}{5} & \frac{2}{5} & 1 \end{bmatrix}$
(c) $\begin{bmatrix} \frac{1}{10} & 0 & 0 \\ 0 & \frac{1}{10} & \frac{1}{10} \\ \frac{2}{5} & \frac{2}{5} & 1 \end{bmatrix}$
(d) $\begin{bmatrix} \frac{1}{10} & 0 & 0 \\ 0 & \frac{1}{10} & 0 \\ \frac{1}{10} & \frac{2}{5} & 1 \end{bmatrix}$

11. Using the origin as centre of projection what is the one point perspective projection on to the plane passing through the point $P(x_0, y_0, z_0)$ and having the normal vector $N = n_x I + n_y J + n_z K$ of a point $A(x, y, z)$

(a) $\begin{bmatrix} d_0 & 0 & 0 & n_1 \\ 0 & d_0 & 0 & 0 \\ 0 & 0 & d_0 & n_3 \\ 0 & n_2 & 0 & 0 \end{bmatrix}$
(b) $\begin{bmatrix} d_0 & 0 & 0 & 0 \\ 0 & d_0 & 0 & n_2 \\ 0 & 0 & d_0 & n_3 \\ n_1 & 0 & 0 & 0 \end{bmatrix}$
(c) $\begin{bmatrix} d_0 & 0 & 0 & n_1 \\ 0 & d_0 & 0 & n_2 \\ 0 & 0 & d_0 & 0 \\ 0 & 0 & 0 & n_3 \end{bmatrix}$
(d) $\begin{bmatrix} d_0 & 0 & 0 & n_1 \\ 0 & d_0 & 0 & n_2 \\ 0 & 0 & d_0 & n_3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

12. Given points $P_1(1, 2, 0)$, $P_2(3, 6, 20)$ and $P_3(2, 4, 6)$ and a view point $C(0, 0, -10)$. Then which point obscure the other when viewed from C?
(a) P_1 obscure P_2
(b) P_1 obscure P_3
(c) P_3 obscure P_2
(d) P_3 obscure P_1

13. Let $V_1 = 2I - J + K$ and $V_2 = I + J + K$. Find a unit vector perpendicualr to both V_1 and V_2.

(a) $\frac{-2}{12} I - \frac{1}{13} J + \frac{3}{14} K$
(b) $\frac{-2}{14} I - \frac{1}{13} J + \frac{3}{12} K$
(c) $\frac{-2}{14} I - \frac{1}{14} J + \frac{3}{13} K$
(d) $\frac{-2}{14} I - \frac{1}{14} J + \frac{3}{14} K$

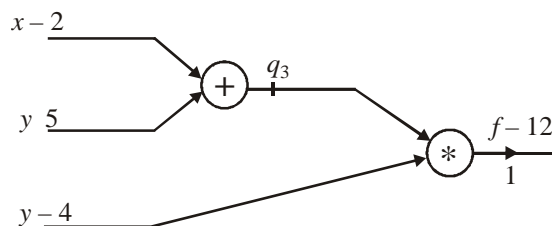14. "Hari pushed the car" is represented in Concenptual dependency as :
(a) Hari $\Leftarrow$ PROPEl $\Leftarrow$ Car
(b) Hari $\Leftrightarrow$ PROPEl $\Leftrightarrow$ Car
(c) Hari $\Rightarrow$ PROPEL $\Leftarrow$ Car
(d) Hari $\Leftrightarrow$ PROPEL $\Leftarrow$ Car

15. Suppose you have inputs as x, y and z with values -2, 5 and -4 respectively. You have a neuron 'q' and neuron 'f' with functions :
$q = x + y$
$f = q * z$
Graphical representation of the function is as follows :

What is the gradient of f with respect to x, y, and z?
(a) $(-3, 4, 4)$
(b) $(4, 4, 3)$
(c) $(-4, -4, 3)$
(d) $(3, -4, -4)$

16. Constraint satisfaction search can be used to solve which of the following problem?
    (a) Map coloring problem
    (b) N-Queen problem
    (c) Crypt Arthmetic Problem
    (d) All of the above

17. Which of the following is known as the Brain of Expert System?
    (a) KB
    (b) Working Memory
    (c) Inference Engine
    (d) Expert System Shell

18. Which of the following is the Blind search
    (a) A*
    (b) AO*
    (c) A* with h = 0
    (d) Beam Search

19. Which ordering of input values builds the most unbalanced BST? Assume values are inserted from left to right.
    (a) 1 7 2 6 3 5 4
    (b) 1 2 3 4 6 7 5
    (c) 4 2 1 6 3 8 7
    (d) 4 2 1 3 6 5 7

20. This array [8, 4, 2, 7, 1, 0, 9, 3, 5] is turned into a max-heap by running the build-heap function. What does the array look like afterwards?
    (a) [9, 8, 7, 6, 5, 4, 3, 2, 1, 0]
    (b) [9, 8, 2, 7, 4, 1, 0, 6, 5, 3]
    (c) [9, 8, 2, 4, 7, 1, 0, 6, 3, 5]
    (d) [9, 8, 2, 6, 7, 1, 0, 4, 3, 5]

21. Consider a hash table with N slots, where $N \geq 5$. If Collisions are resolved by separate chaining and
    A = The probability that all 3 keys are placed in different chains
    B = The probability that all 3 keys are placed in the same chain.
    C = The probability that exactly 2 of these 3 keys are placed in the same chain.
    Then which of the following correct?

    (a) $A = \dfrac{(N-1)(N-2)}{N^3}; B = \dfrac{1}{N^3}; C = \dfrac{3(N-1)(N-2)}{N^3}$

    (b) $A = \dfrac{(N-1)(N-2)}{N^3}; B = \dfrac{1}{N^3}; C = \dfrac{3(N-1)}{N^3}$

    (c) $A = \dfrac{(N-1)(N-2)}{N^3}; B = \dfrac{1}{N^3}; C = \dfrac{3(N-1)(N-2)}{N^2}$

    (d) $A = \dfrac{(N-1)(N-2)}{N^2}; B = \dfrac{1}{N^2}; C = \dfrac{3(N-1)}{N^2}$

22. Use the array [9, 5, 8, 4, 7, 3, 6, 2] as input for each sorting algorithm below.
    1. The array contents after two passes of insertion sort.
    2. The array contents after two passes of selection sort.
    3. The array contents after two passes of bubble sort
    P. [5, 8, 9, 4, 7, 3, 6, 2]
    Q. [2, 3, 8, 4, 7, 5, 6, 9]
    R. [5, 4, 7, 3, 6, 2, 8, 9]
    Find the correct match?
    (a) 1-R, 2-P, 3-Q
    (b) 1-P, 2-Q, 3-R
    (c) 1-Q, 2-P, 3-R
    (d) 1-R, 2-Q, 3-P

23. Consider the following recursive C function. If get (6) function is being called in main () then how many times will the get () function be invoked before returning to the main ()?
    void get (int n)
    {
        if (n < 1) return;
        get (n – 1);
        get (n –3);
        print ("%d", n);
    }
    (a) 15
    (b) 35
    (c) 45
    (d) 25

24. Consider the following program

```
int x;
int main () {
        x = 14;
        f( );
        g( ); }
void f() {
        int x = 13;
        h( ); }
void g ( ) {
        int x = 12
        h ( ); }
void h ( ) {
        print f("%d", x);
}
```

What is the output if static and dynamic scoping is used respectively?

(a) 14, 14, and 13, 12   (b) 13, 12, and 14, 14

(c) 14, 14 and 12, 13   (d) 12, 13 and 14, 14

25. Let Q denote a queue containing sixteen numbers and S be an empty stack. Head (Q) returns the element at the head of the queue Q without removing it from Q. Similarly Top(S) returns the element at the top of S without removing it form S. Consider the algorithm given below.
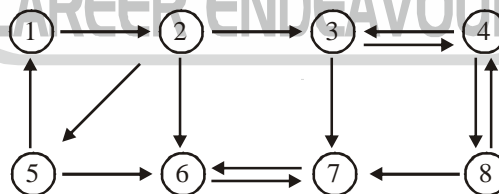
while Q is **not** Empty **do**
  if S is Empty OR Top(S) ≤ Head (**Q**)**then**
    x : = Dequeue (Q);
    Push (S, x);
  else
    x : = pop(S):
    Enqueue(Q, x);
  end
end

What is the difference between the maximum and minimum number of iteration the above code executed?
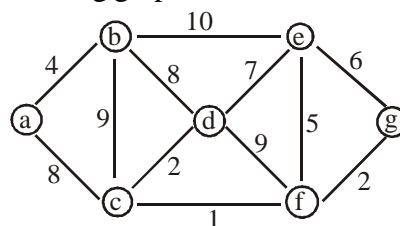
(a) 256   (b) 16   (c) 240   (d) 248

26. Consider the following graph

ORIGINAL G[V,E]GRAPH

How many strongly connected component the above graph has?

(a) 1   (b) 3   (c) 5   (d) 4

27. What is the cost of MST for the following graph

(a) 21   (b) 22   (c) 23   (d) 25

28. The following Knapsack bag. The Knapsack bag maximum Capacity is 50. Find out the maximum profit for Fractional Knapsack

Objects	P	Q	R	S	T	V	W	X
Weights	18	12	16	14	16	20	10	15
Profits	34	15	22	16	17	22	18	26

(a) 87.625   (b) 90   (c) 80   (d) 85.12

29. What is the number of multiplication in Matrix Chain Multiplication for getting ABCD with dimensions $P = <2, 3, 4, 5, 7>$

(a) 134   (b) 160   (c) 207   (d) 220

30. Which of the following statement is false?
(a) All NPC problems are NP Hard.
(b) If NP $\neq$ CO-NP then P $\neq$ NP
(c) If P $\neq$ NP then NP $\neq$ CO-NP
(d) If P = NP then NP = CO-NP

31. Let us consider the following 2 fuzzy sets
$A = (x_1, 0.2), (x_2, 0.17), (x_3, 1), (x_4, 0)$; $B = (x_1, 0.5), (x_2, 0.3), (x_3, 1), (x_4, 0.1)$
What is a $A \oplus B$?
(a) $(x_1, 0.15), (x_2, 0.17), (x_3, 0), (x_4, 0.1)$ (b) $(x_1, 0.5), (x_2, 0.7), (x_3, 1), (x_4, 0.1)$
(c) $(x_1, 0.15), (x_2, 0.7), (x_3, 1), (x_4, 0.6)$ (d) $(x_1, 0.5), (x_2, 0.7), (x_3, 0), (x_4, 0.1)$

32. Suppose we have the two following fuzzy relations:

$$R_1(X \rightarrow Y) = \begin{bmatrix} 1 & .3 & .9 & 0 \\ .3 & 1 & .3 & 0 \\ .9 & .8 & .9 & 1 \\ 0 & 1 & .8 & 1 \end{bmatrix} \quad R_2(Y \rightarrow Z) = \begin{bmatrix} 1 & .3 & .9 \\ 1 & 1 & .5 \\ .3 & .1 & 0 \\ .3 & .3 & 1 \end{bmatrix}$$

What is the Max-Min product of R_1 and R_2

(a) $\begin{bmatrix} 1 & 1 & .9 \\ 1 & .3 & .5 \\ .9 & .9 & .9 \\ 1 & 3 & .5 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 1 & .9 \\ 1 & .3 & .5 \\ .9 & .8 & .7 \\ 1 & .3 & .5 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 1 & .9 \\ 1 & .3 & .5 \\ .9 & .9 & .9 \\ 1 & .3 & .5 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 1 & .9 \\ 1 & .3 & .5 \\ .9 & .9 & .9 \\ 1 & .2 & .3 \end{bmatrix}$

33. Which of the following grammar is an operator grammar?
(a) S $\rightarrow$ aSb – bSa |SS|λ (b) S $\rightarrow$ aSbSa|bSaSa|λ
(c) S $\rightarrow$ aSbSa|bSaSa|a (d) None of these

34. Consider the following grammar G
S $\rightarrow$ BB; B $\rightarrow$ aB |b
Which of the following statement is true regarding above grammar?
(a) G is LL (1) but not LR (1)   (b) G is SLR (1) but not LR (1)
(c) G is LALR (1) but not LR (1)   (d) G is LL(1), SLR (1), LALR (1) and LR(1)

35. Consider the following grammar with semantic rules
E $\rightarrow$ E +E {print "exam"}
E $\rightarrow$ E*E {print "for ur"}
E $\rightarrow$ id {print "Gud luck"}
What is the output if aboves SDD is executed on id + id * id?
(a) Gud luck Gud luck Gud luck for ur exam
(b) Gud luck Gud luck exam Gud luck for ur
(c) Gud luck Gud luck exam Gud luck for ur exam
(d) Either A or B

36. Which of the following grammar is correct for the following language?
L = $\{a^m b^n c^k | k = m + n\}$
(a) $S \rightarrow aSc|A; A \rightarrow bAc|\varepsilon$
(b) $S \rightarrow aSc|bSc|\varepsilon$
(c) $S \rightarrow aSb|A; A \rightarrow bAc|\varepsilon$
(d) None of the above

37. How many minimum number of states in DFA required for the following language $L_1 = \{w\varepsilon\{0,1\}*|$ w has 10th symbol as 1 from the end $\}$
(a) 11
(b) 10
(c) 1024
(d) 1023

38. Consider the following DFA
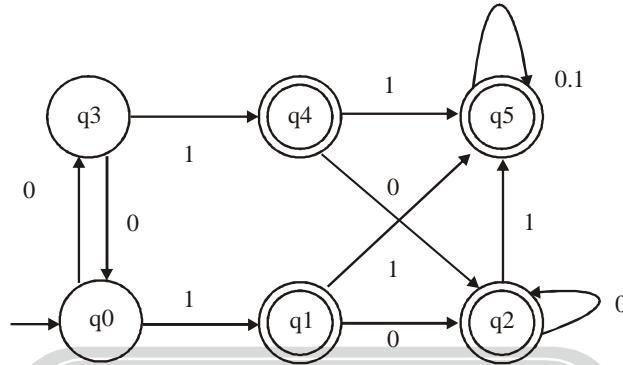
What is the number of state in minmized DFA ?
(a) 3
(b) 4
(c) 5
(d) 6

39. What is the regular expression for the set of all binary string not containing two 0's side by side
(a) $(1 + 01)*(0 + \varepsilon)$
(b) $(0 + \varepsilon)(1+10)*$
(c) $(1 + 01)*$
(d) Either A or B

40. Which of the following statement is false?
(a) If a language L and its complement $\overline{L}$ is recursive enumerable then L and $\overline{L}$ both are recursive.
(b) All linear grammars are recursive enumerable
(c) There exists a recursive language which is not CFL.
(d) The regular languages are closed with respect to subset, infinite intersection, infinite union.

41. How many 2-input multiplexes are required to construct a 2^{10}-input multiplexer
(a) 1023
(b) 31
(c) 10
(d) 127

42. Let A be a set having 'n' elements. The number of binary operations that can be defined on A is
(a) n^{n^2}
(b) 2^{n^n}
(c) n^{2*}
(d) 2^{2*}

43. The values of x and y, if $(x567)_8 + (2yx5)_8 = (72yx)_8$ is
(a) 4, 3
(b) 3, 3
(c) 4, 4
(d) 4, 5

44. Consider the following program fragment:
```
START :    MVT   C, FFH
           INX   B
LOOP :     ADD   B
           DCR   C
           JAZ        LOOP
           HLT
```
LOOP will be executed
(a) 255 times
(b) only one time
(c) 256 times
(d) forever

45. For mainting file system, running processes and deformining access, we may use
(a) system call or commands
(b) library function
(c) commands only
(d) none of these

46. A file is removed from the disk, if
(a) owner of the file deletes it
(b) count in the open file description table becomes zero
(c) reference count in its inode becomes zero
(d) none of these

47. Static variable declared in a class are also called
(a) instance variable
(b) class variable
(c) global variable
(d) named constant

48. Which of the following is not a false statement about new operator?
(a) it can't be overloaded
(b) it returns garbage value when memory allocation fails
(c) it automatically computes the size of the data object
(d) all of the above

49. Consider the following program:
```
        ORG   8000H
START :   LXI   H,      8000H
        MOVE A, L
        ADD   H
        JM    XYZ
        RST   0
XYZ :    PCHL
        HLT
```
Pick out the correct statement from the following
(a) The program will branch to 0000H after JM XYZ
(b) The program will branch to 0008H after JM XYZ
(c) The program will halt the processor
(d) The program will be repeated infinitely

50. Which of the following is C++ style type casting?
(a) per = total/(float)m
(b) per = total /float (m)
(c) per = (float) total/m;
(d) None of these

51. If a program uses inline function, then the function is expanded inline at
(a) Compile time
(b) Run time
(c) Both (a) and (b)
(d) None of these

52. Object based language differs OOP's having as it dose not support features
(1) Encapusulation (2) Inheritance (3) Dynamic binding (4) Abstraction
(5) Polymorphism
(a) Only 3, 4
(b) only 1, 3, 5
(c) 2, 4, 5
(d) only 2, 3

53. While redefining a virtual function in the derived class, if prototype is changed then _____
(a) It will be overloaded by the compiler
(b) Its virtual nature will be lost
(c) Both (a) and (b)
(d) Compiler will generate "Prototype mismatch error"

54. In a program, if there exists a function template with two parameter and normal function say void add (int, int), so add (3, 4) will be _____
(a) Invoke function template body as it is generic one
(b) Invokes normal function as it exactly matcher with its prototype
(c) Not be called a compiler issues warning
(d) Not be called and compiler issues ambiguity in calling add ( )

55. Assume class Test which of the following statement is responsible to invoke copy constructor?
(a) Test T2(T1);
(b) Test T4 = T1;
(c) Test T2 = T1;
(d) both (a) and (b)

56. Let S = {1, 2, 3, 4}. A relation R defined in S as R = {(1, 2), (4,3), (2, 2), (2, 1), (3, 1)} is
(a) transitive
(b) symmetric
(c) anti-symmetric
(d) none of the above

57. Let A and B be two arbitrary events. Then

    (a) $P(A \cap B) = P(A)P(B)$ (b) $P(A \cup B) = P(A) + P(B)$

    (c) $P(A / B) = P(A \cap B) + P(B)$ (d) $P(A \cup B) \leq P(A) + P(B)$

58. If $(G, *)$ is an abelian group, then

    (a) $x = x^{-1}$, for any x belonging to G

    (b) $x = x^2$, for any x belonging to G

    (c) $(x * y)^2 = x^2 * y^2$, for any x, y belonging to G

    (d) G is of finite order

59. Here are the statements of 4 boys
    Manic: Subbu ate it
    Subbu: Joshi ate it
    Kumar: I didn't eat it
    Joshi: I didn't eat it
    Only one of them is telling the truth. Who ate it?
    (a) Mani   (b) Subbu   (c) Kumar   (d) Joshi

60. AB and BA are 2 two-digit numbers such that AB + BA = CAC. What is A + B + C (As same C is not 0)
    (a) 13   (b) 14   (c) 15   (d) None of these

61. The number of possible equivalence relations on the set {1, 2, 3, 4} is
    (a) 15   (b) 16   (c) 24   (d) 4

62. Which testing is the re-execution of some subset of tests that have already been conducted to ensure the changes that are not propagated?
    (a) Unit testing   (b) Regression testing   (c) Integration testing   (d) Thread-based testing

63. The model that assumes that effort and development time are functions of product size alone is
    (a) Basic COCOMO model   (b) Intermediate COCOMO model
    (c) Detailed COCOMO model   (d) All the three COCOMO models

64. Match the **List-1** to **List-2** and choose the correct option
    List-1:   **List-2:**
    (1) Requirement Elicitation   (A) Module
           development and integration
    (2) Design   (B) Analysis
    (3) Implementation and behavioral   (C) Structure
    (4) Maintenance tuning   (D) Performance
    (a) 1-C, 2-A, 3-D, 4-B   (b) 1-C, 2-A, 3-B, 4-D   (c) 1-A, 2-C, 3-D, 4-B   (d) 1-B, 2-C, 3-A, 4-D

65. What are the three generic phases of software engineering?
    (a) Definition, development, support   (b) What, how, where
    (c) Programming, debugging, maintenance   (d) Analysis, design, testing

66. Which of the following are advantages of using LOC (lines of code) as a size oriented metric?
    (a) LOC is easily computed
    (b) LOC is a language dependent measure
    (c) LOC is a language independent measure
    (d) LOC can be computed before a design is completed.

67. Compute function point value for a project with the following domain characteristics:
    Number of I/P = 30
    Number of O/P = 62

Number of user Inquiries = 24

Number of files = 8

Number of external interfaces = 2

Assume that all the complexity adjustment values are average. Assume that 14 algorithms have been counted.

(a) 665   (b) 700   (c) 660   (d) 663

68. The reliability of a program be 0.8. The reliability of an equivalent program (i.e., another program that the serves the same purpose) is 0.9. The probability that both the programs give the wrong result for the same input is

(a) 0.72   (b) 1.7   (c) 0.1   (d) 0.02e

69. The program volume of a source code that has 10 operators including 6 unique operators and 6 operands including 2 unique operands is

(a) 48   (b) 120   (c) 720   (d) insufficient data

70. In TD-SDMA, there is a frame of _____milliseconds and the frame is divided into _____ time slots.

(a) 5, 7   (b) 7, 5   (c) 2, 5   (d) 5, 2

71. Radio capacity may be increased in cellular concept by

(a) Increase in radio spectrum

(b) Increasing the number of base stations & reusing the channels

(c) Both a & b

(d) None of the above

72. Spectrum Efficiency of a cellular network is

(a) The traffic carried by whole network

(b) The traffic carried per cell divided by the bandwidth of the system and the area of a cell

(c) Expressed in Erlang /MHz /km2

(d) Both (b) and (c)

73. A computer system that used memory mapped I/O configuration has a 32 bit address space. Address with is in the two MSB refer to devices. What is the maximum amount & memory I/O devices and port address can be referred in such a system respectively

(a) 3×2^{30} and 1×2^{30} (b) 1×2^{30} and 3×2^{30}

(c) 2×2^{30} and 1×2^{20} (d) 3×2^{32} and 1×2^{32}

74. A byte addressable computer has a memory capacity of 2^m kbytes and can perform 2^n operations. An instruction involving 3 operands and operators needs a maximum of

(a) 3 m bits   (b) 3 m +n bits   (c) m + n bits   (d) None of the above

75. Four persons A, B, C, D are assigned four jobs as given under. What is the proper assignment.

$$
\begin{array}{c c c c c}
 & A & B & C & D \\
I & 8 & 10 & 17 & 9 \\
II & 3 & 8 & 5 & 6 \\
III & 10 & 12 & 11 & 9 \\
IV & 6 & 13 & 9 & 7 \\
\end{array}
$$

(a) I $\to$ A, II $\to$ C, III $\to$ D, IV $\to$ B   (b) I $\to$ B, II $\to$ C, III $\to$ D, IV $\to$ A

(c) I $\to$ C, II $\to$ D, III $\to$ B, IV $\to$ A   (d) I $\to$ B, II $\to$ D, III $\to$ A, IV $\to$ C

76. The given maximization assignment problem can be converted into minimization by

(a) subtracting each entry in the table by maximum value in that table.

(b) multiplying each entry by –1.

(c) Both (a) and (b).

(d) None of the above.

77. Solve the LPP problem :

    $$\text{Max } 6x_1 + 5x_2$$
    $$x_1 + x_2 \leq 5$$
    $$3x_1 + 2x_2 \leq 12$$
    $$x_1\, x_2 \geq 0$$

    The above problem has
    (a) Optimal solution   (b) Degenerate   (c) Unbounded   (d) Infeasible

78. If RTT of 20 Mbps Ethernet is 46.4 μsec. Then find the minimum frame size in the network.
    (a) 832 bits   (b) 928 bits   (c) 734 bits   (d) 684 bits

79. A IP packet has arrived in which the fragmentation offset value is 100, the value of HLEN is 5 and the value of total length field is 200. What is the number of the last byte.
    (a) 194   (b) 394   (c) 979   (d) 1179

80. Which among the following is incorrect about TCP and UDP ?
    (a) TCP are reliable and automatically breaks data into packet.
    (b) UDP is reliable and has no concept of connection.
    (c) Manual sending of data is there in UDP.
    (d) In UDP, if a packet is lost then the data packet has to again resent and locating of data packet is not easy.

81. Match the following :

List-I		List-II	
A.	Application layer	1.	TCP
B.	Transport layer	2.	HDLC
C.	Network layer	3.	HTTP
D.	Data link layer	4.	BSP

    Codes :
    (a) A-2, B-1, C-4, D-3   (b) A-3, B-4, C-1, D-2
    (c) A-3, B-1, C-4, D-2   (d) A-2, B-4, C-1, D-3

82. Which of the following IP address class is a multicast address ?
    (a) Class A   (b) Class B   (c) Class C   (d) Class D

83. An IP packet has arrived with the first 8 bits as 01000010. Which of the following is CORRECT ?
    (a) The number of hops this packet can travel is 2.
    (b) The total number of bytes in header is 16 bytes.
    (c) The upper layer protocol is ICMP.
    (d) The receiver rejects the packets.

84. Consider a secured environment making use of symmetric key cryptography. Every host connects every other hosts. Calculate the number of unique key required if there are 5 hosts in the network.
    (a) 10   (b) 12   (c) 13   (d) 15

85. In which cipher method plain text characters gets shifted to regular pattern to form cipher text.
    (a) Transposition cipher   (b) Substitution cipher
    (c) Stream cipher   (d) None of these

86. Consider a system with m resources of same type being shared by n process. Resouces can be requested and released by process only one at a time. The system is deadlock free if and only if.
    (a) The sum of all max needs is $< m + n$.   (b) The sum of all max need is $> m + n$.
    (c) The sum of all max need is $> m \times n$.   (d) The sum of all max need is $< m * n$.

87. Suppose a system contains n processes and system uses the round-robin algorithm of CPU scheduling, then which data structure is best suited ready queue of the process
    (a) Stack   (b) Queue   (c) Circular queue   (d) Tree

88. Consider the following process and resource requirement of each process.
    Predict the state of this system, assuming that there are a total of 5 instances of resource type-1 and 4 instance of resource type-2.

Process	Type-1		Type-2	
	Used	Max	Used	Max
P_1	1	2	1	3
P_2	1	3	1	2
P_3	2	4	1	4

(a) Can go to safe or unsafe state based on sequence.
(b) Running state.
(c) Safe state.
(d) Unsafe state.

89. The minimum time delay between the initation of two independent memory operation is called
    (a) Access time   (b) Cycle time   (c) Rotational time   (d) Latency time

90. How many disk block are needed if we used free list method. Disk block address is 16 bits, disk block size 64 bytes, total number of blocks are 4096 out of which 2048 are free blocks.
    (a) 64   (b) 256   (c) 16   (d) 512

91. For a given reference string find the number of page faults 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1, if we use LRU algorithm with available frames are three.
    (a) 12   (b) 10   (c) 14   (d) 9

92. Consider the following set of processes.

Process number	Arrival time	CPU burst time
P_1	0	7
P_2	2	4
P_3	6	7

What is the waiting time for a process P_3 if round-robin scheduling with time quantum 5 ms is used
(a) 4   (b) 5   (c) 6   (d) None of these

93. Match the following groups :

Group-I	Group-II
A. FCFS	1. Important processes get execute first.
B. Round-robin	2. Minimize the average waiting time.
C. SRTF	3. The processes run in the order they arrived.
D. Priority scheduler	4. Every process get a chance to execute.

Codes :
(a) A-1, B-2, C-3, D-4   (b) A-4, B-3, C-2, D-1
(c) A-3, B-4, C-2, D-1   (d) A-2, B-1, C-3, D-4

94. Which of the following is correct with respect to two phase commit protcol?
    (a) Ensure serializabelity   (b) Prevent deadlock
    (c) Detects Deadlock   (d) Recover from Deadlock

95. The 'Commond' used to change contents of one database using the contents of another data bases linking them on a common key field is called

    (a) Replace   (b) Join   (c) Change   (d) Update

96. The Relation scheme of a table R(A, B, C, D) has the following functional dependencies

    $AB \rightarrow D$

    $BC \rightarrow D$

    $A \rightarrow C$

    $C \rightarrow A$

    The highest normal form of this relation scheme is

    (a) 2NF   (b) 3NF   (c) BCNF   (d) 4NF

97. Let x, y, z, a, b, c be the attributes of an entity set E. If {x}, {x,y},{a, b},{a, b, c}{x, y, z} are super keys then which of the following are the candidate keys?

    (a) {x, y} and {a, b}   (b) {x} and {a, b}

    (c) {x, y, z} and {a, b,c}   (d) {z} and {c}

98. Which of the following is aggregate function in SQL?

    I. Join   II. AVG   III. MAX

    IV. MIN   V. Orderded by

    (a) Only I, II and III   (b) Only II, III, IV, and V

    (c) Only I, V Only   (d) None of these

99. An athelete can play on several teams and each team needs at least one players

    Athelete ——— Play for ——— Team

    Based on the description above what is the maximum Cardinality between each instance of "Athelete" and 'team'?

    (a) 1 : 1   (b) m : 1   (c) 1 : m   (d) M : N

100. Consider the term "trivial functional dependency" choose which of the following statement is true?

    (a) if and functional dependency $x \rightarrow y$ holds, where y is not a subset of x. then it is called a trivial functional dependency.

    (b) if a functional dependency $x \rightarrow y$ holds where y is subset of x, then it is called a trivial functional dependency

    (c) if a functional dependency $x \rightarrow y$ holds where y is a proper subset of x, then it is called a trivial functional dependencies.

    (d) None of the above

Space for rough work

CAREER ENDEAVOUR
Best Institute for IIT-JAM, NET & GATE

UGC-NET COMPUTER SCIENCE & APPLICATIONS

Test Series- E

Date: 03-07-2018

ANSWER KEY

PAPER – I

1. (b)	2. (a)	3. (d)	4. (b)	5. (c)	6. (a)	7. (a)
8. (d)	9. (a)	10. (c)	11. (d)	12. (a)	13. (b)	14. (d)
15. (a)	16. (b)	17. (c)	18. (a)	19. (d)	20. (d)	21. (d)
22. (c)	23. (d)	24. (d)	25. (c)	26. (a)	27. (c)	28. (d)
29. (c)	30. (a)	31. (d)	32. (b)	33. (b)	34. (a)	35. (d)
36. (d)	37. (a)	38. (b)	39. (c)	40. (c)	41. (a)	42. (a)
43. (b)	44. (c)	45. (a)	46. (a)	47. (b)	48. (d)	49. (c)
50. (a)						

PAPER – II

1. (a)	2. (c)	3. (a)	4. (a)	5. (a)	6. (b)	7. (d)
8. (a)	9. (c)	10. (b)	11. (d)	12. (a)	13. (d)	14. (d)
15. (c)	16. (d)	17. (c)	18. (c)	19. (b)	20. (a)	21. (d)
22. (b)	23. (d)	24. (a)	25. (c)	26. (c)	27. (b)	28. (a)
29. (a)	30. (c)	31. (d)	32. (a)	33. (c)	34. (d)	35. (d)
36. (a)	37. (c)	38. (a)	39. (d)	40. (d)	41. (a)	42. (a)
43. (a)	44. (c)	45. (a)	46. (c)	47. (b)	48. (c)	49. (d)
50. (b)	51. (b)	52. (d)	53. (c)	54. (b)	55. (d)	56. (d)
57. (d)	58. (c)	59. (c)	60. (d)	61. (b)	62. (b)	63. (a)
64. (d)	65. (a)	66. (a)	67. (d)	68. (d)	69. (a)	70. (a)
71. (b)	72. (d)	73. (a)	74. (d)	75. (b)	76. (c)	77. (b)
78. (b)	79. (c)	80. (d)	81. (c)	82. (d)	83. (d)	84. (a)
85. (a)	86. (a)	87. (c)	88. (d)	89. (b)	90. (b)	91. (a)
92. (b)	93. (c)	94. (a)	95. (b)	96. (b)	97. (b)	98. (d)
99. (d)	100. (b)					