

1. A binary tree has 9 nodes. In-order and pre-order of the tree are as follows :

In-order : E A C K F H D B G

Pre-order : F A E K C D H G B

What is the post-order traversal? **[JNU 2011]**

- (a) E C K A H B G D E (b) E K C A H B G D E
 (c) K F A E C D H G B (d) None of the above.
2. A bus has exactly six stops on its route. The bus first stops at stop one and then at stops two, three four, five and six respectively. After the bus leaves stop six, the bus turns and returns to stop one and repeats the cycle. These stops are at six buildings that are, in alphabetical order L, M, N, O, P and Q. Some other information about the stops are as follows :

P is the third stop.

M is the sixth stop.

O is the stop immediately before Q.

N is the stop immediately before L.

In case N is the fourth stop, which among the following must be the stop immediately before P? **[JNU 2011]**

- (a) O (b) Q (c) N (d) L.
3. A differential equation in determinant is given by

$$\begin{vmatrix} y(x) & y'(x) \\ \sin x & \cos x \end{vmatrix} = 0$$

where $y'(x) = \frac{dy(x)}{dx}$ is the derivative of y with respect

to x. What to state about the differential equation solutions? **[JNU 2011]**

- (a) it has no solution.
 (b) it has finite number of solutions.
 (c) it has countable number of solutions.
 (d) it has uncountable number of solutions.
4. What will be printed from the following program block?

```
{
char s1[50] = "xyzt"
char *s2 = "xyat"
int dif;
dif = strcmps (s1, s2)
printf("\n %d", dif);
}
```

[JNU 2011]

- (a) 1 (b) 25 (c) 15 (d) -1.
5. What will be the eigenvalues of the lower triangular matrix defined by

$$\begin{bmatrix} 1 & 0 & 0 \\ 5 & -1 & 0 \\ 8 & -2 & 2 \end{bmatrix} ?$$

a[JNU 2011]

- (a) 1, 2, -1 (b) 1, 5, 8
 (c) 5, 8, -2 (d) none of the above.
6. MPEG in multimedia system stands for : **[JNU 2011]**
- (a) Motion Phase Experts Group
 (b) Motion Picture Experts Group

- (c) Media PHase Experts Group
 (d) Media Picture Experts Group

7. A survey recently conducted revealed that marriage is fattening. The survey found that on a average, women gained 23 pounds and men gained 18 pounds during 13 years of marriage. The answer to which among the following questions would be the most appropriate in evaluating the reasoning presented in the survey?

(a) Why is the time period of the survey 13 years, rather than 12 or 14? **[JNU 2011]**

(b) Did any of the men surveyed gain less than 18 pounds during the period he was married?

(c) How much weight is gained or lost in 13 years by a single people of comparable age to those studied in the survey?

(d) When the survey was conducted were the women as active as the men?

8. Which of the graph traversals of an unweighted graph can be used to generate path in ascending order of length of the path? **[JNU 2011]**

(a) BFS (b) DFS

(c) Any of the above (d) None of the above.

9. The inverse of a skew-symmetry matrix of odd order :

(a) is a symmetric matrix. **d[JNU 2011]**

(b) is a skew-symmetric matrix.

(c) is a diagonal matrix. (d) does not exist.

10. Five educational films A, B, C, D and E are to shown to a group of students. The films are to be shown in a particular order which conforms to the following conditions :

A must be shown earlier than C.

B must be shown earlier than D.

B should be the fifth film shown.

Which among the following is an acceptable order for showing the educational films? **[JNU 2011]**

(a) A, C, B, D, E (b) A, B, D, E, B

(c) B, D, C, A, E (d) B, D, C, A, E.

11. Find the sum of the infinite of complex numbers given by :

$$\sum_{k=1}^{\infty} \frac{(1+2)^k}{5^k}, \text{ where } i^2 = -1 \quad \mathbf{d[JNU 2011]}$$

- (a) ∞ (b) $\frac{1}{2}(1+i)$ (c) $1 - 2i$ (d) $\frac{1}{2}i$.

12. Consider the following assertions :

(i) Let A be a square matrix such that $A^{100} = I$ implies A is invertible.

(ii) When A, B are invertible matrices of same size, $ABA^{-1} = B$ will be satisfied.

(iii) When A is invertible, then $(A + A^t)$ is invertible, where A^t is the transpose of A.

From the above, identify the assertions which is/are not necessarily true. **c[JNU 2011]**

- (a) (i) only (b) (i) and (ii) only
 (c) (ii) and (iii) only (d) none of the above
13. Six scientists A, B, C, D, E and F are to present a paper each at a one-day conference. Three of them will present their papers in the morning session before the lunch break whereas the other three will be presented in the afternoon session. The lectures have to be scheduled in such a way that they comply with the following restrictions : **(JNU 2011)**

B should present his paper immediately before C's presentation; their presentations cannot be separated by the lunch break.

D must be either the first or the last scientist to present his paper.

In case C is to be the fifth scientist to present his paper, then B must be the :

- (a) first (b) second (c) third (d) fourth
14. Consider the following statement :
 Let A, B be square matrices of same size.
 Some conclusions may be derived as follows :
- (i) If A, B are invertible, then $AB = BA$ will be satisfied.
 (ii) If the matrix (AB) is invertible, then $(AB)^{-1} = ((B^t A^t)^{-1})^t$ will be satisfied, where t denotes the transpose.
 (iii) If A, B are invertible, then $B^{-1} = A^{-1} - B^{-1}(B - A)A^{-1}$ will be satisfied. **c[JNU 2011]**

From the above, identify which conclusion is/are true.

- (a) (i) only (b) (i) and (ii) only
 (c) (ii) and (iii) only (d) None of the above
15. The following functions are defined on the real line :

$$f_1(x) = \begin{cases} 0, & \text{when } x \text{ is rational} \\ 1, & \text{when } x \text{ is irrational} \end{cases}$$

Identify the correct statement. **d[JNU 2011]**

- (a) f_1, f_2 have uncountable number of points of non-differentiability
 (b) f_1, f_2 have countable number of points of non-differentiability
 (c) f_1, f_2 have finite number of points of non-differentiability
 (d) None of the above
16. As Lava is related to Volcano, which of the following relations stands valid ? **(JNU 2011)**
 (a) Ice : Glass (b) Cascade : Precipice
 (c) Stream : Geyser (d) Avalanche : Ice
17. End-around carry (EAC) generated in 1's complement arithmetic should be : **(JNU 2011)**
 (a) discarded (b) added to the result
 (c) subtracted from the result
 (d) preserved for the next operation
18. Which of the following words is most opposite in meaning to the word ABATE ? **(JNU 2011)**
 (a) Attach (b) Alter (c) Assist (d) Augment
19. Consider the following program segment :
`for(i = 0, j = strlen(s) - 1; i <= j; i++, j--)`
`{`
`c = s[i];`

$$s[i] = s[j];$$

$$s[j] = c;$$

$$x = c * 5;$$

}

In the above, $x = c * 5$; is **(JNU 2011)**

- (a) dead code (b) loop invariant
 (c) basic code (d) None of the above
20. The equation of the plane passing through the point (1, 5, -7) having normal vector $4i - 17j - 3k$, where i, j and k are unit vectors in the X-, Y- and Z-direction respectively, will be : **d[JNU 2011]**
 (a) $41x - 17y - 3z - 39 = 0$ (b) $21x - 2y - 3z - 19 = 0$
 (c) $x + 5y - z - 29 = 0$ (d) None of the above
21. OPTAB and SYMTAB are data structures used by
 (a) assembler (b) loader
 (c) compiler (d) parser **(JNU 2011)**
22. If $x^4 = 16$, then what will be the value of 4^x ? **[JNU 2011]**
 (a) 2 (b) 4 (c) 16 (d) 12
23. Let L be a set of letters, d the set of digits and o the set of other symbols, then $/. * (1 | d | o) * . /$ is **(JNU 2011)**
 (a) comment string in Pascal or C language
 (b) grammar of the comment string in Pascal or C language
 (c) deterministic finite automata of the comment string in Pascal or C language
 (d) regular expression of the comment string in Pascal or C language
24. For a function (sequence) defined by the rules $s(1) = 1$, $s(2) = 2$ and $s(n + 1) = 2s(n) - s(n - 1)$, the values of $s(4)$, $s(5)$ and $s(6)$ respectively are : **[JNU 2011]**
 (a) 4, 5, 6 (b) 4, 5, 11 (c) 5, 6, 11 (d) 5, 6, 7
25. The truth value of the formula $[(\neg(p \wedge q) \rightarrow r) \leftrightarrow \neg(r \rightarrow s)]$, if truth value of p be true, q be false, r be true and s be false, is : **(JNU 2011)**
 (a) tautology (b) true (c) false (d) invalid
26. Mohan drives to Sushil's house at an average speed of 40 mph. If he can drive $\frac{2}{3}$ of the way in an hour, how far away is Sushil's house ? **(JNU 2011)**
 (a) 60 miles (b) 20 miles (c) 80 miles (d) 50 miles
27. Consider the following statements and determine which of the options is valid : **(JNU 2011)**
 (i) Compilers synthesis target programs,
 (ii) Right recursion is preferred over left recursion for recursive descent parsing.
 (iii) The LL(k) grammars enhance the efficiency of the bottom-up parsers.
 (iv) Parse trees graphically exhibit the derivation of a word using the grammar of a language.
 (a) Only (i) is true (b) Only (i) and (ii) are true
 (c) Only (i) and (iii) are true (d) Only (i) and (iv) are true
28. The functions f and g are defined by $f(x) = |2x + 1|$ and $g(x) = 3$ for all number x. What is the least value of c for which $f(c) = g(c)$? **d[JNU 2011]**
 (a) 1 (b) -1 (c) 2 (d) -2
29. If a file of size $n = 1000$ takes 5 ms for sorting using heap-sort algorithm, then approximately how much

time would it take to sort a file of size $n = 1000000000000$? Assume that all data are available in the main memory. **(JNU 2011)**

- (a) 20 ms (b) 5000000000 ms
(c) 200000000 ms (d) 200000000000 ms

30. Let z be a standard normal random variable and for a fixed x , set

$$X = \begin{cases} z, & \text{if } z > x \\ 0, & \text{otherwise} \end{cases}$$

What will be $E[X]$? **c[JNU 2011]**

- (a) 0 (b) 1 (c) $\frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}$ (d) x

31. If $y = \sin(\sin x)$ and $\frac{d^2 y}{dx^2} + \frac{dy}{dx} \tan x + f(x) = 0$,

then $f(x)$ will be equal to: **d[JNU 2011]**

- (a) $\sin^2 x \sin(\cos x)$ (b) $\sin^2 x \cos(\cos x)$
(c) $\cos^2 x (\sin(\cos x))$ (d) $\cos^2 x \sin(\sin x)$

32. What will be the value of the following computation?

$${}^{20}C_1 + 2 \times {}^{20}C_2 + 3 \times {}^{20}C_3 + \dots + 20 \times {}^{20}C_{20}$$

- (a) 380×2^{20} (b) 20×2^{19}
(c) 20×2^{38} (d) N.O.T. **(JNU 2011)**

33. In a certain code, GIGANTIC is written as GIGTANCI. How will MIRACLES be written in that code?

- (a) MIRLCAES (b) MIRLACSE
(c) RIMCALSE (d) RIMLCAES **(JNU 2011)**

34. If X_1 has mean 1 and variance 5 while X_2 has mean -2 and variance 5, and the two are independent, find the variance of $(X_1 + 2X_2 - 3)$. **a[JNU 2011]**

- (a) 25 (b) 15 (c) 36 (d) N.O.T.

35. What is critical section of a program? **(JNU 2011)**

- (a) A part of OS not allowed to be accessed by any process
(b) A part of memory to be used by the OS only
(c) A set of instructions that access mutually exclusive shared resource
(d) None of the above

36. What will be the value of $\lim_{x \rightarrow \infty} \left(\frac{1 + 5x^2}{1 + 3x^2} \right)^{\frac{1}{x^2}}$?

- (a) e^{-1} (b) e (c) e^2 (d) Limit does not exist **(JNU 2011)**

37. Choose the odd one. **(JNU 2011)**

- (a) Potassium (b) Silicon (c) Gallium (d) Zirconium

38. Consider the two complex-valued functions of complex variable defined by **(JNU 2011)**

$$f_1(z) = x^2 - y^2 + x + i(2x + y) \quad \text{and}$$

$$f_2(z) = 2x^2 + y + i(y^2 - x)$$

where $z = x + iy$ is complex variable so that $i^2 = -1$.

Then, for any complex number z , identify the correct statement.

(a) Both f_1 and f_2 are analytic

(b) f_1 is analytic but not f_2

(c) f_2 is analytic but not f_1

(d) Both f_1 and f_2 are not analytic

39. Suppose three boxes contain a mixture of white and black balls. The first box contains 12 white and 3 black balls; the second contains 4 white and 16 black balls and the third contains 6 white and 4 black balls. A box is selected at random and a single ball is chosen from it. The choice of the box is made according to a throw of a fair die. If the number of spots on the die is 1, the first box is selected. If the number of spots is 2 or 3, the second box is selected; otherwise (the number of spots is equal to 4, 5 or 6) the third box is chosen. Find the probability that a white ball is chosen. **A[JNU 2011]**

- (a) 1/2 (b) 22/45 (c) 3/10 (d) 1/3

40. Let X and Y be two discrete random variable with joint probability mass function given by **B[JNU 2011]**

	X=-1	X=0	X=1
Y=-1	1/12	3/12	1/12
Y=0	1/12	0/12	1/12
Y=1	1/12	3/12	1/12

The values of $E(X)$ and $E(XY)$ respectively are:

- (a) 1, 0 (b) 0, 0 (c) 0, 1 (d) 1, 1

41. Naphthalene is related to woollen in the same way as antibiotic is related to **(JNU 2011)**

- (a) germ (b) immunity (c) disease (d) body

42. If $f(x)$ is a polynomial of degree 8 and $f(x) f(1/x) = f(x) + f(1/x)$, then $f(x)$ is: **b[JNU 2011]**

- (a) an odd function (b) an even function
(c) neither even nor odd function (d) N.O.T.

43. Suppose \$ 3993 is deposited in a savings account which earns 4.3% interest. What is the approximate compound amount after two years if the interest is compounded continuously? **(JNU 2011)**

- (a) \$ 6870 (b) \$ 5326 (c) \$ 4351 (d) \$ 9667

44. Given the following definition, which answer points to contents in x ? **(JNU 2011)**

- $\text{int } x; \text{int } *p = \&x; \text{int } *p = \&p;$
(a) p (b) $\&p$ (c) $**p$ (d) $*p$

45. The period of $|\sin x| - |\cos x|$ is: **b[JNU 2011]**

- (a) 2π (b) π (c) $\pi/2$ (d) N.O.T

46. DWH is related to WDS in the same way as FUL is related to: **(JNU 2011)**

- (a) UFO (b) OFU (c) FOU (d) ELV

47. The derivative of $\sec^{-1} \left(\frac{1}{2x^2 - 1} \right)$ with respect to

$\sqrt{1 - x^2}$ at $x = 1/2$ is: **b[JNU 2011]**

- (a) 2 (b) 4 (c) 1 (d) -2

48. The digit in the unit place of the number $1831 + 3^{183}$ is **(JNU 2011)**

- (a) 7 (b) 6 (c) 3 (d) 4

49. A self-complemented distributive lattice is called:

- (a) Boolean algebra (b) self-dual lattice
(c) modular lattice (d) complete lattice **(JNU 2011)**

50. If there is an error of $k\%$ in measuring the edge of a cube, then the percent error in estimating its volume is: **b[JNU 2011]**
 (a) k (b) $3k$ (c) $k/2$ (d) N.O.T.
51. What is the number that comes next in the following sequence? 4, 6, 12, 14, 28, 30, ... **(JNU 2011)**
 (a) $y = x^2 + x + 1$ (b) $xy = x^2 + x + 1$
 (c) $xy = x + 1$ (d) None of the above
52. The equation of a curve passing through $(2, 7/2)$ and having gradient $1 - (1/x^2)$ at (x, y) is: **b[JNU 2011]**
 (a) $y = x^2 + x + 1$ (b) $xy = x^2 + x + 1$
 (c) $xy = x + 1$ (d) N.O.T.
53. What will be the value of the following expression in C language? $6 < 7 < 5$ **(JNU 2011)**
 (a) True (b) False (c) 1 (d) 2
54. The solution of the differential equation $(1 - y)x \frac{dy}{dx} + (1 + x)y = 0$ is: **a[JNU 2011]**
 (a) $\log|xy| + x - y = c$ (b) $\log|xy| + x + y = c$
 (c) $\log|xy| - x - y = c$ (d) N.O.T.
55. The highest normal form for a relation with two attributes is: **(JNU 2011)**
 (a) 1 NF (b) 2 NF (c) 3 NF (d) BCNF
56. Let X be a Poisson random variable with parameter λ . What will be the value of $P(X \text{ is even}) - P(X \text{ is odd})$?
 (a) $\frac{1}{2}(1 + e^{-2\lambda})$ (b) $\frac{1}{2}(1 - e^{-2\lambda})$
 (c) $e^{-2\lambda}$ (d) N.O.T. **c[JNU 2011]**
57. Which of the following is not a DDL statement? **(JNU 2011)**
 (a) ALTER (b) DROP (c) GRANT (d) CREATE
58. If $f(x) = \cos(\log x)$, then $f(x)f(y) - \frac{1}{2}\{f(x/y) + f(xy)\}$ has the value:
 (a) -2 (b) -1 (c) 1/2 (d) N.O.T. **d[JNU 2011]**
59. Which of the following orderings, from most acceptable to least acceptable levels of cohesion, is correct?
 (a) Sequential, Communicational, Procedural, Logical
 (b) Procedural, Communicational, Temporal, Logical
 (c) Functional, Procedural, Sequential, Logical
 (d) N.O.T. **(JNU 2011)**
60. Ram walks 10 meters in front and 10 meters to the right. Then every time turning to his left, he walks 5 m, 15 m and 15 m respectively. How far is he from his starting point? **(JNU 2011)**
 (a) 5 m (b) 10 m (c) 15 m (d) 20 m
61. If S_1, S_2 and S_3 be respectively the sum of $n, 2n$ and $3n$ terms of a GP, then $\frac{S_1(S_3 - S_2)}{(S_2 - S_1)^2}$ is equal to:
 (a) 1 (b) 2 (c) 3 (d) 4 **(a) [JNU 2011]**
62. The equivalent of $(3124)_4$ to base 3 is: **(JNU 2011)**
 (a) 217 (b) 21000 (c) 22001 (d) 17010
63. If $\sin^{-1}\left(\frac{x^2 - y^2}{x^2 + y^2}\right) = \log a$, then $\frac{dy}{dx}$ equals:
 (a) $\frac{x}{y}$ (b) $\frac{y}{x^2}$ (c) $\frac{x^2 - y^2}{x^2 + y^2}$ (d) $\frac{y}{x}$ **d[JNU 2011]**
64. Let (h, k) be a fixed point, where $h > 0, k > 0$. A straight line passing through this point cuts the positive direction of the coordinate axes at the points P and Q . Which of the following is the minimum area of the triangle OPQ , O being the origin? **b[JNU 2011]**
 (a) hk (b) $2hk$ (c) $1/2 hk$ (d) N.O.T.
65. Alpha testing is a type of: **(JNU 2011)**
 (a) verification testing (b) validation testing
 (c) mutation testing (d) regression testing
66. The area of the region bounded by the parabola $y = x^2 + 1$ and the straight line $x + y = 3$ is given by:
 (a) $\frac{45}{7}$ (b) $\frac{25}{4}$ (c) $\frac{\pi}{18}$ (d) $\frac{9}{2}$ **d[JNU 2011]**
67. A moving-arm disk storage with one head has 200 tracks per recording surface. Disk rotation speed is 2400 r.p.m. and track storage capacity is 62500 bits. What will be the transfer time? **(JNU 2011)**
 (a) 3.75 Mbits/sec (b) 4.25 Mbits/sec
 (c) 2.5 Mbits/sec (d) 1.5 Mbits/sec
68. The population of a country increases at a rate proportional to the number of inhabitants. If the population doubles in 30 years, then the population will triple in approximately how many years?
 (a) 42 (b) 45 (c) 48 (d) 51 **c[JNU 2011]**
69. If it was Saturday on 17th December, 1982, what will be the day on 22nd December, 1984? **(JNU 2011)**
 (a) Sunday (b) Monday (c) Friday (d) Saturday
70. If a, b, c are in AP, then $ax + by + c = 0$ will always pass through a fixed point whose coordinate are: **[JNU 2011]**
 (a) $(1, -2)$ (b) $(-1, 2)$ (c) $(1, 2)$ (d) $(-1, -2)$ **a**
71. The value of $\lim_{x \rightarrow 0} \frac{\int_0^x (x + xt) dt}{\sin x \tan(\pi + x)}$ is: **a[JNU 2011]**
 (a) 0 (b) 1 (c) 2 (d) 1/2
72. Which process model is appropriate for automating an existing manual system? **(JNU 2011)**
 (a) Waterfall model (b) Prototyping model
 (c) Spiral model (d) N.O.T.
73. If $y = \tan^{-1} \frac{x+1}{1-x} + \tan^{-1} \frac{1-x}{1+x}$, then dy/dx is given by:
 (a) $1/(1+x^2)$ (b) $1/(1-x^2)$ (c) $2x/(1+x^2)$ (d) 0 **d[JNU 2011]**
74. A circular queue is implemented as an array of five elements, say $q[5]$, with F (front) and R (rear) pointers initialized as $F = R = -1$. Assuming that F points one position below the actual front element, whereas R

- points to the actual rear element, what would be the values of F and R after the following sequence of operations (D : delete; I : insert) ? I, I, I, D, I, D, I, I, I, D
- (a) F = 2, R = 1 (b) F = 1, R = 2
(c) F = 1, R = 1 (d) N.O.T (JNU 2011)
75. What will be printed from the following C script ?
if ("RAM" = "RAM")
print ("TRUE")
else
printf ("FALSE") (JNU 2011)
(a) True (b) False
(c) Compilation Error (d) Runtime Error
76. A relation R(A, B, C, D) has the set of functional dependencies {B → C, C → A, B → D}. Which of the following decompositions is dependency preserving ? (JNU 2011)
(a) R1(C, A) R2(C, B, D) (b) R1(A, C, C) R2(B, D)
(c) R1(C, A) R2(A, B, C) (d) All of the above
77. The equations $x - y = 4$ and $x^2 + 4xy + y^2 = 0$ represent the sides of (JNU 2011)
(a) an equilateral triangle (b) a right-angled triangle
(c) an isosceles triangle (d) N.O.T.
78. If two relations have no attributes in common, then natural join (JNU 2011)
(a) is a cross product (b) is a non-equi-join
(c) yields no result (d) cannot be performed
79. The circles whose equations are $x^2 + y^2 + x^2 = 2ax$ and $x^2 + y^2 + c^2 = 2by$ will touch one other externally if :
(a) $\frac{1}{b^2} + \frac{1}{c^2} = \frac{1}{a^2}$ (b) $\frac{1}{c^2} + \frac{1}{a^2} = \frac{1}{b^2}$
(c) $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{c^2}$ (d) N.O.T. c[JNU 2011]
80. Which of the following statements is false ? (JNU 2011)
(a) Paging suffers from internal fragmentation
(b) Segmentation suffers from external fragmentation
(c) Segments can be paged
(d) Pages cannot be segmented
81. A constructor is invoked when (JNU 2011)
(a) a class is declared (b) a class is used
(c) an object is declared (d) an object is used
82. If the chord of contact of tangents from a point P to a given circle passes through Q, then the circle on PQ as diameter (JNU 2011)
(a) cuts the given circle orthogonally
(b) touches the given circle externally
(c) touches the given circle internally
(d) None of the above
83. If + means +, - means x, + means + and x means -, then what will be the value of the expression $36 \times 12 + 4 + 2 - 3$? (JNU 2011)
(a) 2 (b) 18 (c) 42 (d) N.O.T.
84. The vertices of the hyperbola $9x^2 - 16y^2 - 36x + 96y - 252 = 0$ are : d[JNU 2011]
(a) (6, 3), (-2, 3) (b) (6, 3), (-6, 3)
(c) (-6, 3), (-6, -3) (d) N.O.T.
85. The simplified expression for the SOP expression $\sum(1, 3, 5, 7, 9, 11, 13, 15)$ corresponding to the inputs ABCD is : (JNU 2011)
(a) D' (b) A' + D' (c) A'B + C'D (d) A + B + C + D
86. If P(X, Y) be any point of ellipse $16x^2 + 25y^2 = 400$ and $F_1 = (3, 0)$, $F_2 = (-3, 0)$, then $PF_1 + PF_2$ equals
(a) 6 (b) 8 (c) 10 (d) 12 c[JNU 2011]
87. Which of the following is not a storage class supported by C++ ?
(a) Auto (b) Register (c) Dynamic (d) Mutable
88. The equation of the plane containing the line $\frac{x+}{-3} = \frac{y-3}{2} = \frac{z+2}{1}$ and the point (0, 7, -7) is :
(a) $x + y + z = 1$ (b) $x + y + z = 2$
(c) $x + y + z = 0$ (d) N.O.T. [JNU 2011]
89. Which of the following is true for linkage editor ?
(a) It is used to edit programs which have to be later linked together
(b) It links object modules and resolves external references between them before loading
(c) It links object modules during compilation
(d) It resolves external references between object modules during execution
90. The angle between two diagonals of a cube is :
(a) $\cos^{-1} \frac{1}{2}$ (b) $\cos^{-1} \frac{1}{3}$
(c) $\cos^{-1} \frac{1}{4}$ (d) $\frac{\pi}{2}$ b[JNU 2011]
91. The number of boys in a class is three times the number of girls. Which of the following numbers cannot represent the total number of students in the class ?
(a) 40 (b) 42 (c) 44 (d) 48 [JNU 2011]
92. In a complete graph of n vertices, how many Hamiltonian circuits are possible ? [JNU 2011]
(a) n! (b) n^2 (c) n^n (d) N.O.T.
93. If the vectors $\hat{i} - 2x\hat{j} - 3y\hat{k}$ and $\hat{i} - 3x\hat{j} - 2y\hat{k}$ are orthogonal to each other, then the locus of the point (x, y) is : [JNU 2011]
(a) a circle (b) an ellipse
(c) a parabola (d) a straight line
94. What is the data structure used by the macroprocessor to expand nested macrocalls ?
(a) Multilist (b) Tree (c) Stack (d) Heap
95. The angle between \vec{a} and \vec{b} is $\frac{5\pi}{6}$, and the projection of \vec{a} in the direction of \vec{b} is $-\frac{6}{\sqrt{3}}$, then $|\vec{a}|$ is equal to : [JNU 2011]

- (a) 6 (b) $\frac{\sqrt{3}}{2}$ (c) 12 (d) 4
96. The variance of the first n natural number is : **A[JNU 2011]**
 (a) $\frac{n^2 - 1}{12}$ (b) $\frac{n^2 - 1}{6}$ (c) $\frac{n^2 + 1}{6}$ (d) $\frac{n^2 + 1}{12}$
97. A dice is rolled three times. What is the probability of getting a large number than the previous number ?
 (a) $\frac{5}{216}$ (b) $\frac{5}{54}$ (c) $\frac{1}{6}$ (d) $\frac{5}{36}$ **b[JNU 2011]**
98. Consider the following statements :
 Some camels are ships.
 No ship is a boat.
 Some conclusions may be derived as follows :
 (i) Some ships are camels.
 (ii) Some boats are camels.
 (iii) Some camels are not boats.
 (iv) All boats are camels.
99. If two events A and B are such that $P(A^c) = 0.3$, $P(B) = 0.4$, $P(A \cap B^c) = 0.5$, then $P(B / A \cup B^c)$ is equal to : **b[JNU 2011]**
 (a) 0.20 (b) 0.25 (c) 0.30 (d) 0.35
100. The angle between the minute hand and the hour hand of a clock when the time is 7 : 20 AM, is : **[JNU 2011]**
 (a) 100 derees (b) 104 degrees
 (c) 108 degrees (d) 112 degrees
101. If $\sin A = \sin B$ and $\cos A = \cos B$, then the value of A in terms of B is : **[JNU 2011]**
 (a) $n\pi + B$ (b) $n\pi + (-1)^n B$
 (c) $2n\pi + B$ (d) $2n\pi - B$
102. An aeroplane flying horizontally 1 km above the ground is observed at an elevation of 60 degrees and after 10 s the elevation is observed to be 30 degrees. The uniform speed of the aeroplane in kilometers per hour is :
 (a) $60\sqrt{3}$ (b) 240 (c) $240\sqrt{3}$ (d) N.O.T **[JNU 2011]**
103. In a class of 55 students, the number of students studying different subects is 23 in Mathematics, 24 in Physics, 19 in Chemistry, 12 in Mathematics and physics, 9 in Mathematics and Chemistry, 7 in Physics and Chemistry and 4 in all the three subjects. The number of students who have taken exactly one subject is : **d[JNU 2011]**
 (a) 6 (b) 7 (c) 9 (d) 22
104. At the end of a conference, all the ten people present shake hands with each other once. How many handshakes will there be altogether ? **b[JNU 2011]**
 (a) 20 (b) 45 (c) 55 (d) 90
105. If α and β are the roots of $x^2 - 2x + 4 = 0$, then $\alpha^n + \beta^n$ is equal to : **[JNU 2011]**

- (a) $2^n \cos \frac{n\pi}{3}$ (b) $2^n \cos \frac{(n+1)\pi}{3}$
 (c) $2^{n+1} \cos \frac{n\pi}{3}$ (d) $2^{n+1} \cos \frac{(n+1)\pi}{3}$
106. $\frac{(-1+i\sqrt{3})^{15}}{(1-i)^{20}} + \frac{(-1-i\sqrt{3})^{15}}{(1+i)^{20}}$ is equal to :
 (a) -64 (b) -32 (c) -16 (d) $1/16$ **a[JNU 2011]**
107. If the roots of the equation $12x^2 - mx + 5 = 0$ are in the ratio 2 : 3, then m is equal to : **d[JNU 2011]**
 (a) $2\sqrt{10}$ (b) $5\sqrt{10}$ (c) $3\sqrt{10}$ (d) N.O.T.
108. In a round-robin CPU scheduling algorithm, let s represent the time for context switch, q denote the time quantum and r denote the average time a process runs before blocking on I/O. What will be the CPU efficiency if $s < q < r$? **(JNU 2011)**
 (a) $\frac{r}{r+s}$ (b) $\frac{s}{r+s}$ (c) $\frac{q}{q+s}$ (d) N.O.T.
109. If $\int f(x)dx = g(x)$, then $\int f^{-1}(x)dx$ is equal to :
 (a) $g^{-1}(x)$ (b) $xf^{-1}(x) - g(f^{-1}(x))$
 (c) $xf^{-1}(x) - g^{-1}(x)$ (d) $f^{-1}(x)$ **(JNU 2011)**
110. Consider a logical address space of 8 pages each of 1024 words mapped into memory of 32 frames. How many bits are there in the physical address ?
 (a) 15 (b) 13 (c) 11 (d) 9 **(JNU 2011)**
111. The value of $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow S)$ is equivalent to : **(JNU 2011)**
 (a) $S \rightarrow R$ (b) $R \rightarrow S$ (c) $S \wedge R$ (d) $S \vee R$
112. In a connected graph of n vertices, what will be the length of a Hamiltonian path (if it exists) ? **(JNU 2011)**
 (a) n (b) $n + 1$ (c) $n - 1$ (d) $n/2$
113. A relation R on a set $A = \{1, 2, 3, 4, 5\}$ is defined by $xRy : x + 1 = y$. What is R^3 ? **(JNU 2011)**
 (a) $\{(1, 3), (2, 4)\}$ (b) $\{(1, 3), (2, 5)\}$
 (c) $\{(1, 4), (2, 5)\}$ (d) $\{(1, 4), (4, 5)\}$
114. Suppose X is a continuous random variable with density function $f : E[|X - A|]$ which is minimized when A is equal to : **c(JNU 2011)**
 (a) median (b) mode
 (c) mean (d) standard deviation
115. What will be the value of the integral $\int_C xy^2 dy$, where the path of integration C is the quarter circle defined by the parameter variable t as $x = 4 \cos t$, $y = 4 \sin t$ and $0 \leq t \leq \pi/2$? **(JNU 2011)**
 (a) 4π (b) 8π (c) 16π (d) N.O.T.

116. Sanjay has 7 friends. In how many ways can he invite one or more friends at dinner ? **c(JNU 2011)**
(a) 125 (b) 126 (c) 127 (d) 128
117. What will be the value of $4 \tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{239}$?
(a) π (b) $\pi/2$ (c) $\pi/3$ (d) $\pi/4$
118. What will be printed from the following block ?
d = 0;
for (i = 1; i < 31; ++i)
for (j = 1; j < 31; ++j)
for (k = 1; k < 31; ++k)
if (((i+j+k)%3) == 0)
d = d + 1;
(a) 9000 (b) 27000 (c) 3000 (d) N.O.T.
119. The total number of ways in which three distinct number in AP can be selected from the set {1, 2, 3, ..., 24} is equal to : **b[JNU 2011]**
(a) 66 (b) 132 (c) 198 (d) None of the above
120. The minimum number of colors needed to color a graph having n (>3) vertices and 2 edges is :
(a) 4 (b) 3 (c) 2 (d) 1