PU-ACTUAL PAPER-2024

1. Which of the following is not a possible Ordered Pair for a matrix with 6 elements?
   (a) (2,3) (b) (3,2) (c) (1,6) (d) (3,1)
2. 10 years ago, a woman was thrice the age of her daughter. Two years later her daughter's age will be 30 more than the age of the mother. What are the present ages of the woman and the daughter?
   (a) 70 years, 40 years (b) 60 years, 40 years
   (c) 55 years, 25 years (d) 45 years, 20 years
3. Find the principal solutions of the equation cos x = 1/2.
   (a) $\pi/6, 5\pi/6$ (b) $\pi/3, 5\pi/3$
   (c) $\pi/3, 2\pi/3$ (d) $2\pi/3, 5\pi/3$
4. A pole stands vertically on the floor. From a point, it is 120 meters away from the foot of the pole and the angle of elevation is 45° then find the height of the pole.
   (a) 100 meters (b) 180 meters
   (c) 120 meters (d) 10 meters
5. Find the equation of circle which passes through (5, 9) and Center at (2, 5).
   (a) $x^2+y^2+4x-10y+4=0$ (b) $x^2+y^2-4x-10y+4=0$
   (c) $x^2+y^2+4x+10y+4=0$ (d) $x^2+y^2+4x-10y-4=0$
6. In How many ways can 5 girls and 3 boys be seated in a row such that no two boys are together?
   (a) 1440 (b) 14400 (c) 1410 (d) 1140
7. The slope of X and Y axis are
   (a) 0 and Undefined (b) Undefined and 0
   (c) Infinity (d) 0 and 0
8. The function f : R → R defined by f(x) = 3 – 4x is
   (a) Onto (b) Not Onto
   (c) One-One (d) One-Two
9. Let A = {1, 2, 3} and consider the relation R = {(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3)}. Then R is
   (a) Reflexive but not Symmetric
   (b) Reflexive but not Transitive
   (c) Symmetric and Transitive
   (d) Neither Symmetric, nor Transitive
10. What is the general formula for finding the magnitude of the cross product of two vectors a and b with angle θ between them?
    (a) |a|.|b| (b) |a|.|b| cos(θ)
    (c) |a|.|b| sin(θ) (d) |a|.|b| tan(θ)
11. What is the representation of complementary event of event A?
    (a) S-A (b) A-S (c) S (d) S+A
12. The slope of the tangent to the curve x = a sin t, y = a{cot t + log(tan t/2)} at the point 't' is
    (a) tan t (b) cot t (c) tan t/2 (d) cot t/2
13. Probability of getting composite number on dice is
    (a) 1/2 (b) 1/4 (c) 1/3 (d) 1
14. f(x, y) = sin(x) + cos(y) + xy^2; x = cos(t); y = sin(t)
    Find df/dt at t = π/2
    (a) 2 (b) -2 (c) 1 (d) 0
15. The function f(x) = x + 4/x has
    (a) A local maxima at x=2 and local minima at x=-2
    (b) Local minima at x=2, and local maxima at x = -2
    (c) Absolute maxima at x = 2 and absolute minima at x = -2
    (d) Absolute minima at x = 2 and absolute maxima at x = -2
16. What will be the value of x + y + z if $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = 3\pi$?
    (a) -1/3 (b) 1 (c) 3 (d) -3
17. Integrate $3x^2(\cos x^3+8)$.
    (a) $\sin x^3-8x^3+c$ (b) $\sin x^3+8x^3+c$
    (c) $-\sin x^3+8x^3+c$ (d) $\sin x^3-x^3+c$
18. Find $\int 5\cos^2 x / 1+\sin x\, dx$.
    (a) -3(x+cos x)+c (b) 5(x+cos x)+c
    (c) 5(-x+sin x)+c (d) 5(xcos x)+c
19. What is the order of the differential equation given by dy/ dx + 4y=sinx?
    (a) 0.5 (b) 1 (c) 2 (d) 0
20. If a matrix A is both Symmetric and Skew-Symmetric, then
    (a) A is a diagonal matrix (b) A is a zero matrix
    (c) A is a scalar matrix (d) A is a square matrix
21. The number of binary operations that can be defined on a set of 2 elements is
    (a) 8 (b) 4 (c) 16 (d) 64
22. Roots of a quadratic equation are real when discriminant is _____
    (a) Zero (b) Greater than zero
    (c) Less than zero
    (d) Greater than or equal to zero
23. Find the height of the cylinder of maximum volume that can be is scribed in a sphere of radius.
    (a) $\frac{2a}{3}$ (b) $\frac{2a}{\sqrt{3}}$ (c) $\frac{a}{3}$ (d) $\frac{3a}{2}$
24. The area of a right-angled triangle of the given hypotenuse is maximum when the triangle is
    (a) Scalene (b) Equilateral
    (c) Isosceles (d) None of these
25. The equation of the normal to the curves y = sin x at (0, 0) is
    (a) x = 0 (b) x + y = 0
    (c) y = 0 (d) x – y = 0
26. The radius of a cylinder is increasing at the rate of 3 m/s and its height is decreasing at the rate of 4 m/s. The rate of change of volume when the radius is 4 m and height is 6 m, is
    (a) 80π cu m/s (b) 144π cu m/s
    (c) 80 cu m/s (d) 64 cu m/s
27. If the two lines with slope m_1 and m_2 are perpendicular then their slopes has relation ____
    (a) $m_1 + m_2 = 1$ (b) $m_1 . m_2 = 1$
    (c) $m_1 . m_2 = -1$ (d) $m_1 + m_2 = -1$
28. At which point does f(x) attain local minima if
    $$f(x)=\int_0^x (t+1)\left(e^t-1\right)(t-2)(t+4)\,dt\,?$$
    (a) 0 (b) -1 (c) 1 (d) -4
29. What will be the range of the function $f(x) = 2x^3 – 9x^2 – 24x + 5$ which increases with x?
    (a) x > 4 (b) x > 4 or x < -1
    (c) x< -1 (d) Can't be determined
30. What is the order of the differential equation given by dy/ dx + 4y=sinx?
    (a) 0.5 (b) 1 (c) 2 (d) 0
31. If the radius of a circle is increased three times then its area is increased:
    (a) Three time (b) Six times
    (c) Nine times (d) Twelve times

32. What are total number of combinations of 9 things taken 3 at a time?
(a) 18 (b) 27 (c) 48 (d) 84

33. A card is drawn from a pack of 52 cards. What is the probability of getting a king of a black suit?
(a) 1/26 (b) 1/52 (c) 3/26 (d) 7/52

34. If the value of $\alpha + \beta = 90^0$, and $\alpha : \beta = 2 : 1$, then what is the ratio of cos α to cos β ?
(a) 1 : 3 (b) $\sqrt{3}:1$ (c) $1:\sqrt{3}$ (d) 3:1

35. If $\tan\theta + \cot\theta = 2$, then what is the value of $\tan^{100}\theta + \cot^{100}\theta$?
(a) 1 (b) 3 (c) 2 (d) 4

36. 3, 5, 7, 9 is an Example of
(a) Arithmetic sequence (b) Geometric sequence
(c) Harmonic sequence (d) Fibonacci sequence

37. If cos A = 2/3, then what is the value of tan A?
(a) 0 (b) 1/2 (c) 5/2 (d) $\frac{\sqrt{5}}{2}$

38. If "a" is the first term and "r" is the common ratio, then the nth term of a G.P is:
(a) ar^n (b) ar^{n-1} (c) $(ar)^{n-1}$ (d) ar

39. If the nth term of an arithmetic progression is 3n-4, then the 10th term of an A.P is
(a) 10 (b) 12 (c) 22 (d) 26

40. Two people X and Y apply for a job in a company. The probability of the selection of X is 2/5, and Y is 4/7. What is the probability that both of them get selected?
(a) 1/6 (b) 27/35 (c) 8/35 (d) 3/35

41. Which variable type can have only two possible values?
(a) Integer (b) String
(c) Double (d) Boolean

42. In a table in MYSQL database, an attribute A of datatype Varchar(20) has the value "BHARAT". The attribute B of datatype Char(20) has value "Meenakshi". How many characters are occupied by attribute A and attribute B?
(a) 20,6 (b) 6,20 (c) 9,6 (d) 6,9

43. Which of the following is NOT an Open-Source Software?
(a) Mozilla Firefox (b) Android
(c) Microsoft Office (d) Linux

44. The amount of time taken by a device to begin reading data is called
(a) Seek time (b) Read time
(c) Access time (d) Write time

45. Currently, Which Programming Language is being mostly used in Data Science?
(a) C++ (b) Java
(c) Python (d) Machine Learning

46. A formula in MS Excel =sum(D1:D10) will
(a) Add first 10 columns
(b) Add first 10 columns of row 4
(c) Add first 10 rows of column 4
(d) Add first 10 rows

47. The Programming Technique where a function calls itself is known as
(a) Inline function (b) Encapsulation
(c) Recursion (d) Debugging

48. After hearing her ordeal, the school decides to publish a set of moral principles that determines the appropriate behaviour of students while using the Internet. The school is referring to_____
(a) Intellectual Property rights
(b) Internet Privacy
(c) Computer Ethics
(d) Cyber Ethics

49. Which of the following Option leads to Portability and Security of Java?
(a) Bytecode is executed by JVM
(b) The applet makes the Java code secure and portable
(c) Use of exception handling
(d) Dynamic binding between objects

50. You have a class A network address 10.0.0.0 with 40 subnets, but are required to add 60 new subnets very soon. You would like to still allow for the largest possible number of host IDs per subnet. Which subnet mask should you assign?
(a) 255.240.0.0 (b) 255.248.0.0
(c) 255.252.0.0 (d) 255.254.0.0

51. Switching the CPU to another Process requires performing a State Save of the Current Process and a State Store of a different Process. This task is known as a___
(a) Swapping (b) Context Switch
(c) Demand Paging (d) Page fault

52. Which out of the below are the two fundamental models of Inter Process Communication?
1. Shared Memory 2. Message Passing
3. Independent Process 4. Cooperating Process
(a) 1,2 (b) 2,3 (c) 3,4 (d) 1,4

53. Which of the following Sorting Algorithms can be used to sort a Random Linked List with Minimum Time Complexity?
(a) Insertion Sort (b) Quick Sort
(c) Heap Sort (d) Merge Sort

54. What will be the output of the program?
```
#include<stdio.h>
int main()
{
int a[5] = {5, 1, 15, 20, 25};
int i, j, m;
i = ++a[1];
j = a[1]++;
m = a[i++];
printf("%d, %d, %d", i, j, m);
return0;
}
```
(a) 2, 1, 15 (b) 1, 2, 5
(c) 3, 2, 15 (d) 2, 3, 20

55. Find the SQL statement below that is equal to the following: SELECT NAME FROM CUSTOMER WHERE STATE = 'VA';
(a) SELECT NAME IN CUSTOMER WHERE STATE IN ('VA');
(b) SELECT NAME IN CUSTOMER WHERE STATE = 'VA';
(c) SELECT NAME IN CUSTOMER WHERE STATE = 'V';
(d) SELECT NAME FROM CUSTOMER WHERE STATE IN ('VA');

56. The new findings on the Virus caused panic among the scientists and management _____.
(a) like (b) likely (c) alike (d) dislike

57. Nuclear energy is _____ dangerous to be used widely.
(a) so (b) such (c) too (d) that

58. In spite of extensive research, formula for generating prime numbers is still a/an
(a) enigma (b) embargo
(c) vicious (d) voracious

59. The Synonym for CEASE is:
(a) BEGIN (b) STOP
(c) CREATE (d) DULL

60. The Antonym for TERRIBLE would be
(a) Soothing (b) Frightening
(c) Scaring (d) Delectable

61. Though he has lot of money, yet all his plans are built upon Sand. Which of the options below are closest in meaning to the underlined text?
(a) Established on insecure foundations
(b) Based on inexperience
(c) Resting on cheap material
(d) Resting on immature ideas

62. A person who renounces the world and practices Self-Discipline in order to attain salvation is called?
(a) Sceptic (b) Ascetic
(c) Devotee (d) Antiquarian

63. Find the Correctly Spelt Word
(a) Affedevit (b) Afidevit
(c) Affidevit (d) Affidavit

64. Select the pair which has the same Relationship
PAIN : SEDATIVE
(a) comfort : stimulant (b) grief : consolation
(c) trance : narcotic (d) ache : extraction

65. We waited for over an hour ____ the bus–stop. Fill the Correct Preposition.
(a) at (b) in (c) by (d) on

(Answer the Questions 66-68 on the basis of Below Paragraph)

There is a family of six persons P, Q, R, S, T and U.
Their professions are Engineer,
Doctor, Teacher, Salesman, Manager and Lawyer.
There are two married couples in the family.
The Manager is the grandfather of U, who is an Engineer
R, the Salesman, is married to the lady Teacher
Q is the mother of U and T.
The Doctor, S is married to the Manager

66. What is the profession of P?
(a) Lawyer (b) Teacher
(c) Manager (d) Salesman

67. Who are the two Married Couples in the Family?
(a) PQ and SR (b) PS and RQ
(c) PT and SR (d) PU and PT

68. How P is related to T?
(a) Father (b) Grandfather
(c) Mother (d) Grandmother

69. What is the rate of discount if a bicycle whose price was Rs. 4,000, was sold for Rs. 3,200?
(a) 14% (b) 16% (c) 18% (d) 20%

70. If 20% of a number is 40. Then 70% of the number is?
(a) 110 (b) 120 (c) 130 (d) 140

71. The ratio of 50m and 4km is:
(a) 1:20 (b) 1:25 (c) 1:40 (d) 1:80

72. Arun walked 20 m towards the South. Then he turned to his left and walked 15 m. He again turned to his left and walked 20 m. Finally, he turned to his right and walked 10m.
How far and in which direction is he from the starting point?
(a) 15 m East (b) 15 m North
(c) 25 m North (d) 25 m East

73. If AIRLINE is written as ENILRIA7, then RAILWAY will be written as -
(a) YAWLIAR7 (b) YAWLIAR8
(c) YAWILAR7 (d) YAWILAR8

74. Which number is wrong in the series 2, 6, 15, 31, 56, 93?
(a) 6 (b) 31 (c) 56 (d) 93

75. Mohan is facing north-east. He turns 90 degrees in the anticlockwise direction then he turns 135 degrees in the clockwise direction. Which direction is Mohan facing now?
(a) East (b) South
(c) North (d) West

PU-2024 ANSWER KEY

1	2	3	4	5	6	7	8	9	10
d	x	b	c	b	b	a	a,c	a	c
11	12	13	14	15	16	17	18	19	20
a	x	c	b	b	d	b	b	b	b
21	22	23	24	25	26	27	28	29	30
c	d	x	c	b	a	c	b	b	b
31	32	33	34	35	36	37	38	39	40
c	d	a	c	c	a	d	b	d	c
41	42	43	44	45	46	47	48	49	50
d	b	c	c	c	c	c	d	a	d
51	52	53	54	55	56	57	58	59	60
b	a	d	c	d	c	c	a	b	a
61	62	63	64	65	66	67	68	69	70
a	b	d	b	a	c	b	b	d	d
71	72	73	74	75					
d	d	a	d	a					

PU-ACTUAL PAPER 2024 SOLUTIONS

1. **Ans. (d)**

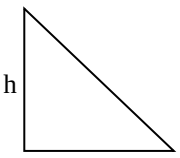
2. **Ans. (x)**

3. **Ans. (b)** $\cos x = \frac{1}{2} = \cos\frac{\pi}{3} \Rightarrow \theta = \frac{\pi}{3}$

Principal values are $\theta, 2\pi - \theta \Rightarrow \frac{\pi}{3}, 2\pi - \frac{\pi}{3}$

$= \frac{\pi}{3}, \frac{5\pi}{3}$

4. **Ans. (c)**



$\Rightarrow \frac{h}{120} = \tan 45° = 1$

$\Rightarrow h = 120°$

5. **Ans. (b)** Equation of circle is $(x - h)^2 + (y - k)^2 = r^2$

where $r = \sqrt{(5-2)^2 + (9-5)^2} = \sqrt{25} = 5$

$\Rightarrow$ Circle is $(x-2)^2 + (y-5)^2 = 5^2$

$\Rightarrow x^2 + y^2 - 4x - 10y + 4 = 0$

6. **Ans. (b)** 5 girls can be seated in $\lfloor 5$ ways = 120 and 3-boys so that no two boys sit together

$= {}^6P_3 = \frac{\lfloor 6}{\lfloor 3} = 6.5.4 = 120$

So total ways = 120.120 =14400

7. **Ans. (a)**

8. **Ans. (a, c)** f(x) = 3 – 4x

is one-one as $x_1 \neq x_2$

$\Rightarrow -4x_1 \neq -4x_2$

$\Rightarrow 3 - 4x_1 \neq 3 - 4x_2 \Rightarrow f(x_1) \neq f(x_2)$

Also f covers total codomain R i.e. range = R

9. **Ans. (a)** It's reflexive / transitive but not symmetric.

10. **Ans. (c)**

11. **Ans. (a)**

12. **Ans. (x)** Here $\frac{dx}{dt} = a\cos t$

$$\frac{dy}{dt} = a\left[-\operatorname{cosec}^2 t + \frac{\frac{1}{2}\sec^2 t/2}{\tan t/2}\right]$$

$$= a\left[-\operatorname{cosec}^2 t + \frac{1}{2\sin\left(\frac{t}{2}\right)\cos\frac{t}{2}}\right]$$

$$= a\left[-\operatorname{cosec}^2 t + \operatorname{cosec} t\right]$$

$$\Rightarrow \frac{dy}{dx} = \frac{dy/dt}{dx/dt} = \frac{-\operatorname{cosec}^2 t + \operatorname{cosec} t}{\cos t}$$

$$= \frac{-1+\sin t}{\sin^2 t \cos t} \Rightarrow \text{No choice matches.}$$

13. **Ans. (c)** Here S = {1, 2, 3, 4, 5, 6}

E = {4, 6} $\Rightarrow P(E) = \frac{2}{6} = \frac{1}{3}$

14. **Ans. (b)** $f(x, y) = \sin x + \cos y + xy^2$

$x = \cos t$, $y = \sin t$

$f(x, y) = \sin(\cos t) + \cos(\sin t) + \cos t \sin^2 t$

$$\frac{df}{dt} = \cos(\cos t)(-\sin t) - \sin(\sin t)\cos t + \left(-\sin^3 t\right) + 2\sin t\cos^2 t$$

$$\left.\frac{df}{dt}\right|_{t=\frac{\pi}{2}} = \cos\left(\cos\frac{\pi}{2}\right)\left(-\sin\frac{\pi}{2}\right)$$

$$-\sin\left(\sin\frac{\pi}{2}\right)\cos\frac{\pi}{2} - \sin^3\frac{\pi}{2} + 2\sin\frac{\pi}{2}\cos^2\frac{\pi}{2}$$

= - 1 – 0 – 1 + 0 = – 2

15. **Ans. (b)** $f = x + \frac{4}{x} \Rightarrow f' = 1 - \frac{4}{x^2} = 0 \Rightarrow x = \pm 2$

$$f'' = +\frac{8}{x^3}\Big|_{\pm 2} \Rightarrow f''(2) > 0 \text{ and } f''(-2) < 0$$

$\Rightarrow$ At x = - 2 MAXIMA, x = 2 MINIMA

16. **Ans. (d)** $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = 3\pi$

$\Rightarrow \cos^{-1}x = \cos^{-1}y = \cos^{-1}z = \pi$

$\Rightarrow x = y = z = \cos\pi = -1$

$\Rightarrow x + y + z = -1 - 1 - 1 = -3.$

17. **Ans. (b)** $\int 3x^2\left(\cos x^3 + 8\right)dx$

Put $x^3 = t \Rightarrow 3x^2\,dx = dt$

$$= \int (\cos t + 8)\,dt = \sin t + 8t + c$$

= $\sin x^3 + 8x^3 + c$

18. **Ans. (b)** $\int \frac{5\cos^2 x}{1+\sin x}dx$

$$= \int \frac{5\left(1-\sin^2 x\right)}{1+\sin x}dx = 5\int (1-\sin x)\,dt$$

= 5[x + cos x] + c

19. **Ans. (b)** $\frac{dy}{dx} + 4y = \sin x$ order is 1

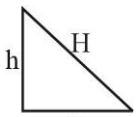
20. **Ans. (b)**

21. **Ans. (c)** As formula is $n^{n^2} = 2^{2^2} = 2^4 = 16$

22. **Ans. (d)**

23. **Ans. (x)**

24. **Ans. (c)**



$H^2 = h^2 + a^2 \Rightarrow r = \sqrt{H^2 - a^2}$

As Area $A = \frac{1}{2}ah$

$$A = \frac{1}{2}a\sqrt{H^2 - a^2}$$

$$\frac{dA}{da} = \frac{1}{2}\left[\sqrt{H^2 - a^2} + \frac{a}{2\sqrt{H^2 - a^2}}.-2a\right]$$

$$= \frac{1}{2}\left[\frac{H^2 - 2a^2}{\sqrt{H^2 - a^2}}\right] = 1 \Rightarrow H^2 = 2a^2$$

$\Rightarrow h = \sqrt{H^2 - a^2} = \sqrt{a^2} = a \Rightarrow$ Isosceles triangle

25. **Ans. (b)** y = sin x

$$\frac{dy}{dx} = \cos x\big|_{x=0} = 1$$

Slope of normal = - 1

$\Rightarrow$ Equation of normal at (0, 0)

y – 0 = - 1 (x – 0) $\Rightarrow$ x + y = 0

26. **Ans. (a)** $\frac{dr}{dt} = 3m/s$, $\frac{dh}{dt} = -4m/s$

$V = \pi r^2 h \Rightarrow \frac{dV}{dt} = \pi\left[2r\frac{dr}{dt}h + r^2\frac{dh}{dt}\right]$

$= \pi [2 \times 24 \times 3 + 4^2 (-4)$

$= \pi [144 - 64] = 80\pi$ cu m/s

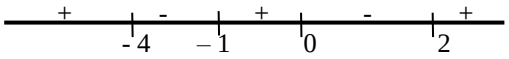
27. **Ans. (c)**

28. **Ans. (b)** $f(x) = \int_0^x (t+1)\left(e^t - 1\right)(t-2)(t+4)\,dt$

$\frac{dF}{dx} = (x+1)\left(e^x - 1\right)(x-2)(x+4) = 0$ by Leibnitz rule

$\Rightarrow$ critical points are

x = - 1, 0, 2, - 4



$\Rightarrow$ f ' changes sign from – ve to +ve at x = - 1, 2

$\Rightarrow$ Local minima at x = - 1, 2

29. **Ans. (b)** $\frac{df}{dx} = 6x^2 - 18x - 24$

$= 6(x^2 - 3x - 4)$

$= 6(x - 4)(x + 1) > 0 \Rightarrow x < -1$ or $x > 4$

30. **Ans. (b)**

31. **Ans. (c)** $A = \pi r^2$

If r $\rightarrow$3r $\Rightarrow A = \pi(3r)^2 = 9\pi r^2 \Rightarrow$ 9 times

32. **Ans. (d)** ${}^9C_3 = \frac{\lfloor 9}{\lfloor 3 \lfloor 6} = \frac{9\times8\times7}{6} = 3\times4\times7 = 84$

33. **Ans. (a)** Here there are two black kings $\rightarrow$ Spade and Club out of 52 cards $= \frac{2}{52} = \frac{1}{26}$

34. **Ans. (c)** $\alpha : \beta = 2 : 1$

$\alpha = 2k$, $\beta = k$

$\alpha + \beta = 90° \Rightarrow 3k = 90° \Rightarrow \alpha = 30°$

$\Rightarrow \alpha = 60°$, $\beta = 30°$

$\cos\alpha = \cos 60° = \frac{1}{2}$

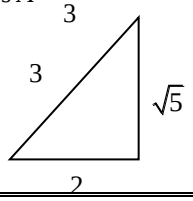
$\cos\beta = \cos 30° = \frac{\sqrt{3}}{2} \Rightarrow \cos\alpha : \cos\beta = 1 : \sqrt{3}$

35. **Ans. (c)** $\tan\theta + \cot\theta = 2$

$\Rightarrow \tan\theta = 1 \Rightarrow \tan^{100}\theta + \cot^{100}\theta = 1+1 = 2$

36. **Ans. (a)**

37. **Ans. (d)** $\cos A = \frac{2}{3}$



$\Rightarrow \tan A = \frac{\sqrt{5}}{2}$

38. **Ans. (b)** $T_n = ar^{n-1}$

39. **Ans. (d)** $T_n = 3n - 4 \Rightarrow T_{10} = 26$

40. **Ans. (c)** $P(X) = \frac{2}{5}$, $P(Y) = \frac{4}{7}$

$P(X \cap Y) = P(X).P(Y) = \frac{2}{5}.\frac{4}{7} = \frac{8}{35}$

41. **Ans. (d)** 42. **Ans. (b)** 43. **Ans. (c)**

44. **Ans. (c)** 45. **Ans. (c)** 46. **Ans. (c)**

47. **Ans. (c)** 48. **Ans. (d)** 49. **Ans. (a)**

50. **Ans. (d)** To determine the appropriate subnet mask, we need to consider the number of subnets and the number of host IDs per subnet.
Starting with the class A network address 10.0.0.0:
1. **Initial number of subnets required**: 40
2. **Total number of subnets needed**: 40 (existing) + 60 (new) = 100 subnets
Subnet Mask Calculation
A Class A network has a default subnet mask of 255.0.0.0, which provides 24 bits for host addresses. We need to borrow bits from the host portion to create subnets.
Calculating Number of Subnets
To create 100 subnets, we need enough subnet bits to represent at least 100 subnets. The formula to determine the number of subnets is 2^n >={number of subnets} , where n is the number of bits borrowed.
2^n >=100
Solving for n :
n = ceil (log_2(100)) = 7 BITS
So, we need to borrow 7 bits from the host portion.
Subnet Mask Calculation
A Class A address with a default subnet mask of 255.0.0.0 (8 bits for the network part) will change when we borrow bits:
New subnet mask = default network bits + borrowed bits = 8 + 7 = 15 bits
This corresponds to a subnet mask of:
255.254.0.0
So, we will use the subnet mask 255.254.0.0, which is option (d).

51. **Ans. (b)** 52. **Ans. (a)** 53. **Ans. (d)**

54. **Ans. (c)** To determine the output of the given program, let's analyze it step by step:

```c
#include<stdio.h>
intmain()
{
inta[5] = {5, 1, 15, 20, 25};
inti, j, m;
i = ++a[1];
   j = a[1]++;
   m = a[i++];
printf("%d, %d, %d", i, j, m);
```

return 0;
}
```
### Step-by-Step Execution

1. **Initialization**:
```c
inta[5] = {5, 1, 15, 20, 25};
```
This initializes the array `a` with the values `{5, 1, 15, 20, 25}`.
2. **Increment `a[1]` and assign to `i`**:
```c
i = ++a[1];
```
- `++a[1]` increments the value of `a[1]` by 1 before using it.
- The value of `a[1]` is initially 1.
- After incrementing, `a[1]` becomes 2.
- `i` is assigned the value 2.
- Now, `a` is `{5, 2, 15, 20, 25}` and `i = 2`.
3. **Post-increment `a[1]` and assign to `j`**:
```c
j = a[1]++;
```
- `a[1]++` uses the current value of `a[1]` (which is 2) and then increments it.
- `j` is assigned the value 2.
- After the increment, `a[1]` becomes 3.
- Now, `a` is `{5, 3, 15, 20, 25}` and `j = 2`.
4. **Use the value of `i` to index `a` and then increment `i`**:
```c
m = a[i++];
```
- `i++` uses the current value of `i` (which is 2) and then increments it.
- `m` is assigned the value of `a[2]`, which is 15.
- After the increment, `i` becomes 3.
- Now, `m = 15` and `i = 3`.
5. **Print the values of `i`, `j`, and `m`**:
```c
printf("%d, %d, %d", i, j, m);
```
Final Values
- `i = 3`
- `j = 2`
- `m = 15`
The output of the program will be:
```
3, 2, 15
This corresponds to option (c).

55. **Ans. (d)** 56. **Ans. (c)** 57. **Ans. (c)**

58. **Ans. (a)** 59. **Ans. (b)** 60. **Ans. (a)**

61. **Ans. (a)** 62. **Ans. (b)** 63. **Ans. (d)**

64. **Ans. (b)** 65. **Ans. (a)**

66. **Ans. (c)**

P (Manager) ≈ $S^-$ (Doctor)
|
$Q^-$ (Teacher) ≈ $R^+$ (Saleman)
|
U (Engineer) – T (Lawyer)

67. **Ans. (b)**

68. **Ans. (b)**

69. **Ans. (d)** MRP = Rs. 4000
S.P. = Rs. 3200
Discount = 4000 – 3200 = 800

$$\text{Discount} = \frac{D}{MRP} \times 100 = \frac{800}{400} \times 100 = 20\%$$

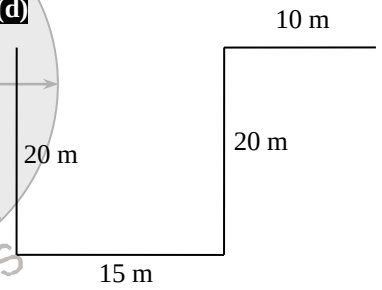
70. **Ans. (d)** 20% = 40

$$1\% = \frac{40}{20} = 2$$

$$70\% = 70 \times 2 = 140$$

71. **Ans. (d)** 50 m : 4 km
50 : 4000
1 : 80

72. **Ans. (d)**




25m, East

73. **Ans. (a)**

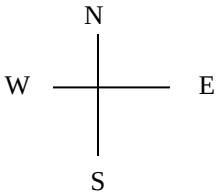
A I R L I N E → E N I L R I A

R A I L W A Y → Y A W L I A R

74. **Ans. (d)**

2, 6, 15, 51, 56, 93
4 9 16 25 37

75. **Ans. (a)**
NE (North East)
90 AC - 90
135 C + 135
+45
∴ 45° clockwise




Required answer is East

**In a day, when you don't come across any problems – you can be sure that you are travelling in the wrong path…… SWAMI VIVEKANANDA**