KIITEE MCA
Solved Paper 2007

Part-A

1. An example for non-weighted code is
   (a) Excess-3   (b) 8421
   (c) 5421   (d) $84\bar{2}\bar{1}$

2. Information is
   (a) Data   (b) Processed data
   (c) Manipulated input   (d) Computer output

3. The number of 1's present in the number 65 is
   (a) 3   (b) 2
   (c) 1   (d) 4

4. How many nibbles are there in 0010101111001011?
   (a) 16   (b) 4
   (c) 2   (d) 6

5. A ternary number system has base
   (a) 4   (b) 3
   (c) 5   (d) 6

6. $(110.101)_2 = (?)_{10}$
   (a) 6.5   (b) 6.05
   (c) 6.25   (d) 6.625

7. 1 KB of memory amounts to
   (a) 1024 bits   (b) 2048 bits
   (c) 4096 bits   (d) 512 bits

8. An input peripheral unit is
   (a) Mouse   (b) Monitor
   (c) Printer   (d) Speaker

9. Odd man out in the given list is
   (a) ROM   (b) RAM
   (c) EPROM   (d) PROM

10. An operating system is a
    (a) Hardware   (b) Software
    (c) Peopleware   (d) None of these

11. Laptop is a
    (a) Wireless device   (b) Personal computer
    (c) Mobile device   (d) All of these

12. ALU is responsible for performing
    (a) only Arithmetic operations
    (b) only Logical operations
    (c) both Arithmetic and Logical operations
    (d) storing the most important data

13. The word VLSI stands for
    (a) Very Large Scale Industry
    (b) Very Large Scale Integration
    (c) Very Large Simple Integration
    (d) None of the above

14. Two PCs can be connected through
    (a) a cable   (b) a group of wires
    (c) wireless link (d) All of these

15. One's complement of $(0000)_2$ in decimal is
    (a) 15   (b) 1
    (c) 8   (d) 0

16. The important registers in the CPU are
    (a) memory address register
    (b) memory data register
    (c) program counter
    (d) All of the above

17. Periodic maintenance of computing systems include
    (a) regular backups on data
    (b) reformatting hard disks
    (c) replacing Backup batteries
    (d) All of the above

18. VIRUS is
    (a) Vital Information Research Under Search
    (b) Very Important Research Upon Speed
    (c) Vital Information Resources Under Siege
    (d) Very Important Resources Under Siege

19. The value of (6) to base 8 when expressed as Gray code is
    (a) 0011   (b) 0101
    (c) 1010   (d) 1100

20. A program which converts a high level language to machine language is
    (a) Assembler
    (b) Loader
    (c) Compiler
    (d) Editor

21. A book and a pen together cost ₹ 88. The book costs ₹ 84 more than the pen. What is the price of the book?
    (a) ₹ 86   (b) ₹ 84
    (c) ₹ 80   (d) ₹ 94

22. One paper has four 4 corners. From this if one corner is cut off, how many corners does the paper have?
    (a) 3   (b) 4
    (c) 6   (d) 5

23. The missing number in the following series is 212, 179, 146, 113,—
   (a) 80   (b) 74   (c) 101   (d) 68

24. If there are three oranges and you take two; how many will you have?
   (a) 1 orange
   (b) 2 oranges
   (c) 3 oranges
   (d) 0 oranges

25. What happens to the area of a square when its side is halved? Its area will
   (a) remain the same
   (b) become half
   (c) become one-fourth
   (d) become double

26. A does a work in 10 days and B does the same work in 15 days. In how many days they together will do the same work?
   (a) 5 days
   (b) 6 days
   (c) 8 days
   (d) 9 days

27. The difference between a number and its three-fifth is 50. What is the number?
   (a) 75
   (b) 100
   (c) 125
   (d) None of these

28. Which of the following has fractions in ascending order?
   (a) 1/3, 2/5, 4/7, 3/5, 5/6, 6/7
   (b) 1/3, 2/5, 3/5, 4/7, 5/6, 6/7
   (c) 1/3, 2/5, 3/5, 5/6, 4/7, 6/7
   (d) 2/5, 3/5, 1/3, 4/7, 5/6, 6/7

29. The average of 5 quantities is 6. The average of 3 of them is 8. What is the average of the remaining two numbers?
   (a) 3
   (b) 4
   (c) 5
   (d) 6

30. Ram, who is half as efficient as Gopal, will take 24 days to complete a work if he worked alone. If Ram and Gopal worked together, how long will they take to complete the work?
   (a) 10 days
   (b) 16 days
   (c) 8 days
   (d) 18 days

31. The last 4 missing fractions in the series 1/2, 1/6, 1/12, 1/20,—,—,—,—,are
   (a) 1/42, 1/56, 1/72, 1/92
   (b) 1/40, 1/50, 1/60, 1/70
   (c) 1/44, 1/58, 1/74, 1/92
   (d) 1/41, 1/55, 1/72, 1/90

32. You buy a bottle of juice for ₹ 1.00. The juice costs 90 paise more than the empty bottle. How much does the empty bottle cost?
   (a) 10 paisa
   (b) 5 paisa
   (c) 7 paisa
   (d) 2 paisa

33. Use all the numbers 1 to 9 and of the four operation $+, -, \times, \div$, and parentheses, to make a total of 100. You may not change the order of the numbers, or use them more than once.
   (a) $1 + 2 + 3 + 4 + 5 + 6 + 7 + (8 \times 9)$
   (b) $(1 \times (2 + 3) \times 4 \times 5) + 6 - 7 - 8 + 9$
   (c) $((1 \times 2 + 3)/4) + 5 + 6 + 7 + 8 + 9$
   (d) Both (a) and (b)

34. The missing number in the series 18, 20, 24, 32, — is
   (a) 48
   (b) 44
   (c) 40
   (d) 42

35. In an examination, a student scores 5 marks for every correct answer and loses 2 marks for every wrong answer. If he attempts all 50 questions and secures 124 marks, the number of questions he correctly attempted is
   (a) 34
   (b) 32
   (c) 30
   (d) 40

36. Name the president of Afghanistan.
   (a) Pervez Musharaff
   (b) Hamid Karzai
   (c) Babrak Karmal
   (d) Mohanned Daud Khan

37. Who is the French Open Women's Champion, 2007?
   (a) Martina Hingis
   (b) 1 Amelie Mauresmo
   (c) Maria Sharapova
   (d) Justine Henin Hardenne

38. The present Pope at the Vatican City is
   (a) John Paul IV
   (b) Benedict XVI
   (c) Pope Gelasius V
   (d) John Paul II

39. The software company I-flex solution was originally a division of which famous financial services company?
   (a) Citicorp
   (b) ICICI
   (c) HSBC
   (d) ABN Amro Bank

40. The weight of an object will be minimum when it is placed at
   (a) the North pole
   (b) the South pole
   (c) the Equator
   (d) the centre of the Earth

41. Which company's chips power more than 60% of the world's cell phones?
   (a) Nokia
   (b) Intel
   (c) Texas Instruments
   (d) Motorola

42. The Indian-American women astronaut on board the space shuttle Atlantis is
   (a) Indra Nooyi
   (b) Kiran Majumdar
   (c) Kalpana Chawla
   (d) Sunita Williams

43. India's national airlines is now called
   (a) Air India
   (b) Indian Airlines
   (c) Indian
   (d) Hindustan

44. Who is the chief minister of Bihar?
   (a) Nitish Kumar
   (b) Narendra Modi
   (c) Mayawati
   (d) Rabri Devi

45. Which nations' national anthem is played at the closing ceremony of the Olympics?
   (a) Greece
   (b) Host nation
   (c) Nation to host the next Olympics
   (d) All of the three

46. Choose the appropriate meaning of the word "enlighten".
   (a) to cause to be one
   (b) to trespass upon
   (c) to cause to see clearly
   (d) to make somewhat different

47. Select the appropriate word.
   When he heard the bad news, he went to ____
   (a) Parts
   (b) Pieces
   (c) Particles
   (d) Sections

48. What is the meaning of "contravene"?
(a) to prevent or abstract the operation
(b) to force
(c) to walk about
(d) to increase in range or scope

49. What is the equivalent word for "to give by will"?
(a) Ante
(b) Bequeath
(c) Extricate
(d) Actuate

50. The synonym of GENERIC is
(a) Typical
(b) Peculiar
(c) Deteriorate
(d) Permanent

51. The antonym of IMPOSING is
(a) Resplendent
(b) Insignificant
(c) Posing
(d) Mislead

52. "A close shave" means
(a) a pub that's always crowded
(b) a neatly shaven face
(c) a narrow escape from danger
(d) a solution that has proved its value in the past

53. Choose the missing word from the sentence given : Ice-cream sales rose ...... last August.
(a) Steep
(b) Steeply
(c) Highly
(d) Quite

54. I ...... (see) Bill this morning, but I ...... (not see) him since.
(a) have seen, haven't seen
(b) saw, haven't seen
(c) have seen, didn't see
(d) had seen, haven't seen

55. Divide the cake ...... the boy and his cousins.
(a) between
(b) among
(c) with
(d) after

56. He came ...... and his sister came ...... too.
(a) by walk, on walk
(b) on walk, by walk
(c) walking, walking
(d) on foot, by walk

57. I admit it's been a hard thing to do, but I finally ...... my way of thinking with yours.
(a) reconciled
(b) acclimatized
(c) suited
(d) matched

58. This book is very difficult for children aged ten and I'm afraid you will have to ...... it.
(a) adjust
(b) fit
(c) adapt
(d) alter

59. Each and every one of the boys and girls present ...... well dressed.
(a) was
(b) were
(c) are
(d) will

60. Choose the correct word needed to complete the following sentence ...... I use your phone please? I have to speak to my friend.
(a) Can
(b) May
(c) Might
(d) World

Part-B

61. What is the correlation coefficient between x and y for the given data?

X	78	89	97	69	59	79	68	57
Y	125	137	156	112	107	138	123	108

(a) 0.96
(b) 0.86
(c) 0.70
(d) 0.91

62. There cities P, Q and R are equidistant from each other. A motorist travels from P to Q at 30 km/h, from Q to R 40 km/h, from R to P at 50 km/h. What is his average speed of travel?
(a) 32.5 km/h
(b) 40 km/h
(c) 35 km/h
(d) 38.3 km/h

63. Let A and B be two events with $P(A) = 1/2$, $P(B) = 1/3$ and $P(A \cap B) = 1/4$, What is $P(A/B)$?
(a) 4/3
(b) 3/4
(c) 2/3
(d) 1/4

64. Let A and B be two events with $P(A) = 1/2$, $P(B) = 1/3$ and $P(A \cap B) = 1/4$, What is $P(A \cup B)$?
(a) 3/7
(b) 4/7
(c) 7/12
(d) 9/122

65. If the probability of a bad reaction from a certain injection is 0.001, then what is the chance that out of 2000 individuals more than two will get a bad injection?
(a) 0.32
(b) 0.25
(c) 0.28
(d) 0.39

66. The mean height of 500 students is 151 cm and the standard deviation is 15 cm. Assuming that the heights are normally distributed, find how many student's height lie between 120 and 155 cm?
(a) 291
(b) 292
(c) 294
(d) 296

67. The value of the given determinant is

$$\begin{vmatrix} 1 & 2 & 3 & 4 \\ 1 & 3 & 3 & 4 \\ 1 & 2 & 4 & 4 \\ 1 & 2 & 3 & 5 \end{vmatrix}$$

(a) 1
(b) 0
(c) 2
(d) 3

68. A tower casts a shadow 100 m long when the elevation of a source of light is at 45°. What is the height of the tower?
(a) $100\sqrt{3}$ m
(b) 100 m
(c) 10 m
(d) $10\sqrt{3}$ m

69. From the top of a light house 360 m height, the angles of depression of the top and bottom of a tower are observed to be 30° and 60° respectively. What is the height of the tower?
(a) 200 m
(b) 210 m
(c) 190 m
(d) 240 m

70. The greatest angle of a triangle with sides 7, 5 and 3 is
(a) 60°
(b) 90°
(c) 120°
(d) 135°

71. For a $\triangle XYZ$, if $x = \sqrt{2}$, $y = 2$, $z = \sqrt{3} - 1$, then $\angle X$ is
    (a) 45°   (b) 60°
    (c) 75°   (d) 30°

72. For the given equation $x^2 + y^2 - 4x + 6y - 12 = 0$, the centre of the circle is
    (a) $(-2, 3)$ (b) $(-3, 2)$
    (c) $(3, -2)$ (d) $(2, -3)$

73. The circumference of the circle
$x^2 + y^2 + 2x + 6y - 12 = 0$, is
    (a) 2π (b) 8π
    (c) 3π (d) None of these

74. The locus of a point which moves in a plane such that its distance from a fixed point is equal to its distance from a fixed line is
    (a) parabola   (b) hyperbola
    (c) ellipse   (d) circle

75. In parabola $y^2 = 4kx$, if the length of latusrectum is 2, then k is
    (a) 1/2   (b) $-1/2$
    (c) 0   (d) 1/2 or $-1/2$

76. A wire of length 20 cm is bent so as to form an arc of a circle of radius 12 cm. The angle subtended at the centre is
    (a) 3/5 rad   (b) 5/3 rad
    (c) 1/3 rad   (d) 5 rad

77. A circular metallic ring of radius 1 foot is reshaped into a circular arc of radius 80 ft. The area of the sector formed is
    (a) 20 sq ft   (b) 40 sq ft
    (c) 80 sq ft   (d) 60 sq ft

78. The point of intersection of lines (i) $x + 2y + 3 = 0$ and (ii) $3x + 4y + 7 = 0$, is
    (a) $(1,1)$ (b) $(1, -1)$
    (c) $(-1,1)$ (d) $(-1, -1)$

79. The acute angle between the lines (i) $2x - y + 13 = 0$ and (ii) $2x - 6y + 7 = 0$, is
    (a) 0°   (b) 30°
    (c) 45°   (d) 60°

80. If A, B, C and D are angles of a cyclic quadrilateral, then $\cos A + \cos B + \cos C + \cos D$ is
    (a) 1   (b) 0
    (c) 2   (d) 3

Answers *with* Solutions

1. (a) Excess-3 is not a weighted code, it is the binary value of three more than the magnitude of a given number.

2. (b) Information is a processed data.

3. (b) $(65)_{10} = (1000001)_2$
    It has two 1's.

4. (b) 0010101111001011 has 16 bit, so it has 4 nibbles as 1 nibble = 4 bit

5. (b) Ternary number system has base 3.

6. (d) $(110.101)_2 = 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$
$$+ 1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3}$$
$$= 4 + 2 + \frac{1}{2} + \frac{1}{8} = 6.625$$

7. (a) $1 \text{ KB} = 2^{10} \text{ B} = 1024 \text{ B}$

8. (a) Mouse is an input peripheral unit.

9. (b) ROM, EPROM and PROM are the secondary storage devices but RAM is the primary storage device.

10. (b) Operating system is a software.

11. (b) Laptop is a personal computer.

12. (c) ALU : Arithmetic and Logic Unit

13. (b) VLSI : Very Large Scale Integration

14. (d) All are the ways of connecting two PC's.

15. (a) 1's complement of $(0000)_2 = (1111)_2 = (15)_{10}$

16. (d) All are important registers in the CPU.

17. (d) All are included in periodic maintenance of computing systems.

18. (c) VIRUS : Vital Information Resource Under Siege

19. (b) $(6)_8 = (6)_{10} = (110)_2$
                  1 1 0
    Gray code of $\downarrow\nearrow\downarrow\nearrow\downarrow$
                  1 0 1
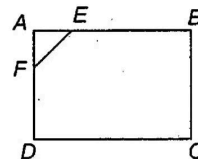   is 0101.

For XOR gate
1 + 1 → 1
1 + 0 → 0
0 + 1 → 0
0 + 0 → 1

Note After retaining Ist bit we take XOR of 1st and 2nd, then 2nd and 3rd and so on.

20. (c)

21. (a) If price of book is ₹ x and price of pen is ₹ y, then,
$x + y = 88$ and $x - y = 84$
$\Rightarrow 2x = 172 \Rightarrow x = 86$

22. (d)

After cutting one corner two corners are created, so altogether we have 5 corners.

23. (a) $212 - 33 = 179$
$179 - 33 = 146$
$146 - 33 = 113$
$113 - 33 = 80$

24. (b) After taking 2 oranges, I have 2 oranges.

25. (c) $A = a^2$ and $A' = \left(\frac{a}{2}\right)^2 = \frac{a^2}{4} = \frac{A}{4}$
$\Rightarrow A'$ is one-fourth of A.

26. (b) In one day A and B together will do $\frac{1}{10} + \frac{1}{15} = \frac{1}{6}$ part of work.
$\Rightarrow$ Together they will do the work in 6 days.

27. (c) If x is the number, then

$$x - \frac{3x}{5} = 50 \Rightarrow \frac{2x}{5} = 50 \Rightarrow x = 125$$

28. (a) The LCM of (3, 5, 7, 5, 6, 7) = 210

Then, 1/3, 2/5, 4/7, 3/5, 5/6, 6/7

$= 70, 84, 120, 126, 175, 180$.

$$\frac{1}{3} < \frac{2}{5} < \frac{4}{7} < \frac{3}{5} < \frac{5}{6} < \frac{6}{7}$$

29. (a) The sum of remaining two numbers $= 5 \times 6 - 3 \times 8 = 6$

$\Rightarrow$ Average of them $= \dfrac{6}{2} = 3$

30. (c) Ram takes 24 days, then Gopal will take 12 days (as Gopal will be twice efficient than Ram) to do the work.

So, in one day Ram and Gopal together will do $\dfrac{1}{12} + \dfrac{1}{24} = \dfrac{1}{8}$ part of the work.

$\Rightarrow$ They will take 8 days to do the work.

31. (a) $6 = 2 + 4, 12 = 2 + 4 + 6$,

$20 = 2 + 4 + 6 + 8, 30 = 2 + 4 + 6 + 8 + 10$

Therefore, denominator of next four fractions will be $30 + 12, 42 + 14, 56 + 16, 72 + 18$

i.e., 42, 56, 72, 90

$\Rightarrow$ Next four fractions are $\dfrac{1}{42}, \dfrac{1}{56}, \dfrac{1}{72}, \dfrac{1}{90}$.

32. (b) If x is the price of juice and y is the price of bottle (in paise), then $x + y = 100$ and $x - y = 90$.

$\Rightarrow y = 5$ paise

33. (d) $1 + 2 + 3 + 4 + 5 + 6 + 7 + (8 \times 9) = 100$

and $(1 \times (2 + 3) \times 4 \times 5) + 6 - 7 - 8 + 9 = 100$

34. (a) $18 + 2 = 20 ; 20 + 2^2 = 24$

$24 + 2^3 = 32 ; 32 + 2^4 = 48$

35. (b) If x questions were correctly attempted, then $(50 - x)$ questions were wrongly answered.

$\therefore \quad 5x - 2(50 - x) = 124$

$\Rightarrow \quad 7x = 224 \Rightarrow x = 32$

36. (b)　**37.** (d)　**38.** (b)　**39.** (a)　**40.** (d)　**41.** (d)

42. (d)　**43.** (b)　**44.** (a)　**45.** (d)

46. (c) Enlighten To give someone information about something so that they understand more about it.

47. (b) Here, 'pieces' means 'broken down' on hearing the bad news.

48. (a) Contravene To do something that is not allowed by a rule, law or agreement.

49. (b) Be queath To give someone money or property after one die by making a legal document called a will.

50. (a) Generic Relating to class of similar things.
Typical Things of the same type.

51. (b) Imposing Large and impressive
Insignificant Not large or important enough to be worth considering.

52. (c)

53. (b) Here, 'steeply' will be used which means rising continuously for a period of time whereas steep means rises quickly for a short period say a day, week or a month.

54. (d) Had seen is the past perfect.
Have seen is the present perfect.

55. (a) Between is used for division.
Among is used for distribution.
With is used for to sharing.

56. (c)

57. (b) Acclimatized To become familiar

58. (a)

59. (b) 'Were' is the plural of 'was' and it is used with a singular subject.
So, in this sentence 'Every one' is followed by were.

60. (b) Here, 'May' is denoting the permission.

61. (a)

X	Y	$X - \bar{X}$	$Y - \bar{Y}$	$(X - \bar{X})(Y - \bar{Y})$	$(X - \bar{X})^2$	$(Y - \bar{Y})^2$
78	125	3.5	−0.75	−2.625	12.25	0.5625
89	137	14.5	11.25	163.125	210.25	126.5625
97	156	22.5	30.25	680.625	506.25	915.0625
69	112	−5.5	−13.75	75.625	30.25	189.0625
59	107	−15.5	−18.75	290.625	240.25	351.5625
79	138	4.5	12.25	55.125	20.25	150.0625
68	123	−6.5	−2.75	17.875	42.25	7.5625
57	108	−17.5	−17.75	310.625	306.25	315.0625
$\Sigma X = 596$	$\Sigma Y = 1006$			$\Sigma(X - \bar{X})(Y - \bar{Y}) = 1591.00$	$\Sigma(X - \bar{X})^2 = 1368$	$\Sigma(Y - \bar{Y})^2 = 2055.5$

$\bar{X} = \dfrac{596}{8} = 74.5 \quad \bar{Y} = \dfrac{1006}{8} = 125.75$

$\text{cov}(X, Y) = \dfrac{\sum(X - \bar{X})(Y - \bar{Y})}{n} = \dfrac{1591}{8} = 198.875$

$\text{var}(x) = \dfrac{\sum(X - \bar{X})^2}{n} = \dfrac{1368}{8} = 171$

$\text{var}(y) = \dfrac{\sum(Y - \bar{Y})^2}{n} = \dfrac{2055.5}{8} = 256.9375$

Correlation coefficient

$= \dfrac{\text{cov}(X, Y)}{\sqrt{V(X) V(Y)}} = \dfrac{198.875}{\sqrt{(171)(256.9375)}}$

$= \dfrac{198.875}{\sqrt{(43936.3125)}} \approx 0.96$

62. (d) Let d be the common distance between each of the given cities P, Q, R

$\Rightarrow$ Average speed $= \dfrac{\text{Total distance}}{\text{Total time}}$

$= \dfrac{d + d + d}{\dfrac{d}{30} + \dfrac{d}{40} + \dfrac{d}{50}} = \dfrac{3}{\dfrac{20 + 15 + 12}{600}}$

$= \dfrac{1800}{47}$ km/h = 38.3 km/h

63. (b) $P(A/B) = \dfrac{P(A \cap B)}{P(B)} = \dfrac{1/4}{1/3} = \dfrac{3}{4}$

64. (c) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \dfrac{1}{2} + \dfrac{1}{3} - \dfrac{1}{4} = \dfrac{6 + 4 - 3}{12} = \dfrac{7}{12}$

65. (c) Mean,

$\lambda = np = 2000(0.001) = 2$

By Poisson's distribution

$$P(X = Y) = \frac{e^{\lambda} \lambda^r}{r!} = \frac{e^{-2} 2^r}{r!} ; r = 0, 1, 2, \ldots$$

$$P(x > 2) = 1 - P(X \leq 2)$$
$$= 1 - [P(X = 0) + P(X = 1) + P(X = 2)]$$
$$= 1 - e^{-2}[1 + 2 + 2] = 1 - \frac{5}{e^2} = 1 - \frac{5}{7} = \frac{2}{7} = 0.28$$

66. (b) $120 = 151 - 31 = 151 - \left(\frac{31}{15}\right) 15$

$$155 = 151 + 4 = 155 + \left(\frac{4}{15}\right) 15$$

$$120 \leq X \leq 155$$

$$\Rightarrow \quad \mu - \frac{31}{15} \sigma \leq X \leq \mu + \frac{4}{15} \sigma$$

$$\Rightarrow \quad \mu - 2.067 \sigma \leq X \leq \mu + 0.267 \sigma$$

which consists of $(0.48065 + 0.10526)$ times of students
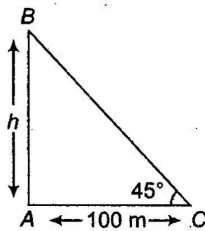$= 500 (0.58591) \approx 292.955$

∴ Number of students required is 292.

67. (a) $\begin{vmatrix} 1 & 2 & 3 & 4 \\ 1 & 3 & 3 & 4 \\ 1 & 2 & 4 & 4 \\ 1 & 2 & 3 & 5 \end{vmatrix} = \begin{vmatrix} 1 & 2 & 3 & 4 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{vmatrix}$

By using $R_2 \to R_2 - R_1, R_3 \to R_3 - R_1$ and $R_4 \to R_4 - R_1$

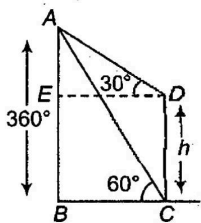$$= \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix} = 1$$

68. (b)

If h is the height of tower and B is the source of light, then AC is the shadow. Then, $\frac{AB}{AC} = \tan 45°$

$$\Rightarrow \quad h = AC = 100 \text{ m}$$

69. (d)

Let $CD = h$ be the height of the tower.
Then, in ΔABC,

$$\tan 60° = \frac{AB}{BC} \Rightarrow \frac{360}{BC} = \sqrt{3}$$

$$\Rightarrow \quad BC = \frac{360}{\sqrt{3}} \quad \ldots(i)$$

In ΔAED, $\tan 30° = \frac{AE}{ED} = \frac{BA - EB}{BC} = \frac{BA - CD}{BC}$

$$\Rightarrow \quad \frac{1}{\sqrt{3}} = \frac{360 - h}{BC} \Rightarrow BC = 360\sqrt{3} - h\sqrt{3} \quad \ldots(ii)$$

From Eqs. (i) and (ii),

$$\frac{360}{\sqrt{3}} = 360\sqrt{3} - h\sqrt{3}$$

$$360 = 360 \times 3 - 3h$$

$$3h = 360 \times 2$$
$$h = 120 \times 2$$
$$h = 240 \text{ m}$$

70. (c) The greatest angle is opposite to the greatest side and

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc} \quad \text{(by cosine law)}$$

$$\Rightarrow \quad \cos A = \frac{3^2 + 5^2 - 7^2}{2(3)(5)} = \frac{-15}{30} = \frac{-1}{2}$$

$$A = 120°$$

71. (d) By cosine formula of triangle, we have

$$\cos X = \frac{y^2 + z^2 - x^2}{2yz} = \frac{(2)^2 + (\sqrt{3} - 1)^2 - (\sqrt{2})^2}{2(2)(\sqrt{3} - 1)}$$

$$= \frac{6 - 2\sqrt{3}}{4(\sqrt{3} - 1)} = \frac{2\sqrt{3}(\sqrt{3} - 1)}{4(\sqrt{3} - 1)} = \frac{\sqrt{3}}{2} \Rightarrow X = 30°$$

72. (d) $x^2 + y^2 - 4x + 6y - 12 = 0$

$$\Rightarrow \quad (x - 2)^2 + (y + 3)^2 = (5)^2$$

$$\Rightarrow \quad \text{The centre of the circle is } (2, -3).$$

73. (d) $x^2 + y^2 + 2x + 6y - 12 = 0$

$$\Rightarrow \quad (x + 1)^2 + (y + 3)^2 = (\sqrt{22})^2$$

$$\Rightarrow \quad \text{Radius of circle is } \sqrt{22}.$$

$$\Rightarrow \quad \text{Circumference is } 2\pi(\sqrt{22}) = 2\sqrt{22}\pi$$

74. (a) The given statement is the definition of a parabola.

75. (d) For parabola $y^2 = 4kx$, length of the latusrectum is

$|4k| = 2$ (given)

$$\Rightarrow \quad |k| = 1/2 \Rightarrow k = +1/2 \text{ or } -1/2$$

76. (b) If 'θ' is the angle subtended by the arc formed by the wire, then it's length will be $r\theta, r$ being the radius of the circle.

$$\Rightarrow \quad (12)(\theta) = 20 \Rightarrow \theta = \frac{20}{12} = \frac{5}{3} \text{ rad}$$

77. (b) Circumference of the circle with radius 1 foot $= 2\pi$ ft. Arc of length 2π will subtend angle of

$\dfrac{2\pi}{2\pi(80)}$ on the centre of the circle with radius 80 ft.

$$\Rightarrow \quad \theta = \frac{1}{80}$$

Area of sector subtending angle θ will be

$$= \frac{1}{2} r^2 \theta = \frac{1}{2} \times (80)^2 \times \frac{1}{80} = 40 \text{ sq ft}$$

78. (d) Solving $x + 2y + 3 = 0$ and $3x + 4y + 7 = 0$

$$\Rightarrow \quad \frac{x}{2} = \frac{y}{2} = \frac{1}{-2} = x = -1 ; y = -1$$

So, point of intersection is $(-1 - 1)$.

79. (c) Slope of line $2x - y + 13 = 0$ is $m_1 = 2$
Slope of line $2x - 6y + 7 = 0$ is $m_2 = 1/3$
Angle between these lines will be

$$\tan^{-1} \frac{m_1 - m_2}{1 + m_1 m_2} = \tan^{-1} \frac{2 - \frac{1}{3}}{1 + 2 \times \frac{1}{3}} = \tan^{-1} \frac{5/3}{5/3}$$

$$\tan^{-1} 1 = 45°$$

80. (b) If A, B, C and D are angles of cyclic quadrilateral, then
$A + C = \pi$ and $B + D = \pi$

$$\Rightarrow \quad A = \pi - C$$

$$\Rightarrow \quad \cos A = \cos(\pi - C) = -\cos C$$

$$\Rightarrow \quad \cos A + \cos C = 0 \quad \ldots(i)$$

Also, $B = \pi - D \Rightarrow \cos B = \cos(\pi - D) = -\cos D$

$$\Rightarrow \quad \cos B + \cos D = 0 \quad \ldots(ii)$$

From Eqs. (i) and (ii), we get

$$\cos A + \cos B + \cos C + \cos D = 0$$