

B.S.N.L

TELECOM TECHNICAL ASSISTANTS

PREVIOUS PAPER

BASIC ENGINEERING

Note: 1. Each Question has got 3 or 4 or 5 choices.

2. Tick mark only one most appropriate answer.

3. Marking more than one answer will attract Zero Marks.

4. Each question carries 5 Marks.

1. Sound waves can travel through

- 1) Solids 2) Liquids 3) Gases 4) All of them

2. Velocity of sound in water is

- 1) More than in the air 2) Less than in the air
3) Equal to that in the air 4) Sound does not travel in water

3. Leading characteristics that distinguish one musical sound from another are

- 1) Loudness 2) Pitch 3) Quality 4) All of them

4. Apparent change in frequency of wave motion between the source and the sound is because of

- 1) Sabine's effect 2) Newton lapse effect
3) Doppler effect 4) None of the above

5. Reverberation time is

- 1) Directly proportional to the volume of the enclosed space
2) Inversely proportional to the absorption coefficient
3) Both (1) and (2) are true
4) None of them is true

6. Which helps most in designing the acoustics of the building.

- 1) Doppler effect 2) Sabine's formula
3) Newton's sound formula 4) None of them

7. Rutherford's experiment suggested that

- 1) Mass of the atom is distributed uniformly
2) Mass of the atom is concentrated in the periphery
3) Mass of the atom is only because of electrons
4) Mass of the atom is concentrated at the centre

8. Size of the nucleus is about

- 1) 10^{-14} m 2) 10^{-2} m 3) 10^{-30} m 4) 10^{-1} m

9. In an atom, electrons are
- 1) Moving in a straight line
 - 2) They are at rest
 - 3) Revolving in different orbits
 - 4) None of the statements is true
10. Who discovered neutrons?
- 1) Chadwick
 - 2) Rutherford
 - 3) J.J. Thomson
 - 4) Bohr
11. Mass number is equal to
- 1) Sum of protons and electrons
 - 2) Sum of protons and neutrons
 - 3) Sum of protons, electrons and neutrons
 - 4) Sum of neutrons only
12. Isotopes are atoms of same element, which have different
- 1) Mass No.
 - 2) Atomic No.
 - 3) Mass No. & Atomic No.
 - 4) None of the above
13. Atomic number is equal to
- 1) Number of protons
 - 2) Number of neutrons
 - 3) Sum of protons and electrons
 - 4) Sum of protons and neutrons
14. Reverse biased PN junction
- 1) Opposes the flow of majority carriers
 - 2) Opposes the flow of minority carriers
 - 3) Assists the flow of minority carriers
 - 4) 1 & 2 are true
 - 5) 1 & 3 are true
15. In a transistor, doping will be more in
- 1) Emitter
 - 2) Collector
 - 3) Base
 - 4) Both Emitter & Collector
16. Voltage gain will be near Unity in case of amplifier with
- 1) Common collector
 - 2) Common Emitter
 - 3) Common Base
 - 4) None of the above
17. In NPN transistor, quiescent point represents
- 1) Highest current gain
 - 2) DC bias condition
 - 3) Highest Voltage gain
 - 4) None of the above
18. In the normal operation of Zener Diode, it will be
- 1) Forward biased
 - 2) Reverse biased
 - 3) Used as an amplifier
 - 4) Used for rectifying AC
19. A Tunnel Diode
- 1) Is a negative resistance device
 - 2) Can be used as an amplifier
 - 3) Both 1 & 2
 - 4) None of the above

20. FETs are
- 1) Voltage operated
 - 2) Current operated
 - 3) Both 1 & 2
 - 4) None of the above
21. Intrinsic semiconductor means semiconductor which is
- 1) Doped with Donor atoms
 - 2) Doped with Acceptor atoms
 - 3) Not Doped
 - 4) None of the above
22. For high speed operations, NPN transistor is preferred to PNP, because
- 1) Mobility of Electron is higher than Hole
 - 2) PNP transistor is difficult to make
 - 3) Doping in PNP is generally higher than in NPN
 - 4) All the above
23. In a transistor, the size of Emitter, Base and Collector in terms of area in decreasing order is
- 1) Emitter - Base - Collector
 - 2) Collector - Base - Emitter
 - 3) Base - Collector - Emitter
 - 4) Collector - Emitter - Base
24. To make a SCR conducting
- 1) A brief triggering pulse is to be applied to the gate
 - 2) Anode to cathode voltage has to be positive
 - 3) The gate must be continuously connected to positive voltage
 - 4) 2 & 3 are true
 - 5) 1 & 2 are true
25. Choose the odd one among the following
- 1) SCR
 - 2) TRIAC
 - 3) Transistor
 - 4) Shockley Diode
26. Which of the following not correct about UJT
- 1) It is a 3 layer PNP or NPN device
 - 2) It is used for timing and oscillator circuits
 - 3) The input voltage is pulled down due to increase in input current
 - 4) It is a negative resistance device
27. What is not correct about semiconductors
- 1) Holes exists in conduction band & Electrons in valence band
 - 2) Conduction band and valence band are separated by Forbidden gap
 - 3) When temperature increases, resistance decreases
 - 4) Doping is done to improve conductivity
28. Two long parallel conductors carrying currents in the opposite directions. each other
- 1) Attract
 - 2) Repel
 - 3) No effect on
 - 4) None of the above
29. Reluctance in magnetic circuits is analogous to.. in electric circuit
- 1) Resistance
 - 2) Voltage
 - 3) Current
 - 4) Power

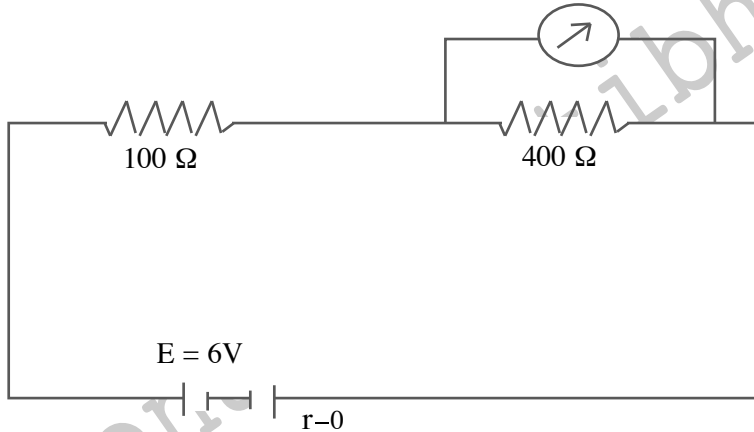
30. Large area of hysteresis loop causes... loss
 1) Less 2) Large 3) No effect on 4) None of the above
31. Aluminium is classified as... magnetic
 1) Ferro 2) Para 3) Dia 4) Non of the above
32. To shield sensitive instruments from str magnetic fields, they are surrounded with
 1) Copper 2) Silver 3) Aluminium 4) Soft iron
33. The work done by a unit north pole in moving once round any single closed path in a magnetic field is numerically equal to number of linked with the path
 1) Turns 2) Flux lines
 3) Ampere turns 4) None of the above
34. Para magnetic materials have their permet ability μ_r as
 1) 1 2) ≤ 1 3) $\gg 1$ 4) ≥ 1
35. The force between 2 conductors carrying currents of I_1 & I_2 and length of L mtrs is give by $F = \dots$ Newton's
 1) $I_1 I_2 L \div 2\pi\mu_0 d$ 2) $\mu_0 2\pi d L \div I_1 I_2$
 3) $\mu_0 I_1 I_2 \div 2\pi d$ 4) None of the above
36. The permeance of a magnetic circuit is give by the reciprocal of it's
 1) Reluctance 2) Flux density
 3) Permeability 4) None of the above
37. The magnetising force H is a solenoid is give by $H =$
 1) $IL + N$ 2) $NL + I$ 3) $I \div NL$ 4) $NI \div L$
38. Magnetic materials having high retentivity and high co-ercivity are most suited for making
 1) Electro magnets 2) Permanent magnets
 3) Transformer core 4) None of the above
39. Induced EMF in circuit is given by $e = \dots$ volt
 1) $N dt \div d\phi$ 2) $N d\phi \div dt$ 3) $d\phi \div dt$ 4) $d\phi \div N dt$
40. Co-efficient of mutual inductance $M = \dots$ Henry.
 1) $N_2\phi_1 \div I_1$ 2) $N_2\phi_2 \div I_2$ 3) $N_2\phi_2 \div I_1$ 4) $N_1\phi_2 \div I_1$
41. Co-efficient of Self Inductance $L = \dots$ Henry
 1) $N\phi \div I$ 2) $I\phi \div N$ 3) $NI \div \phi$ 4) $N\phi I$
42. Diamagnetic substance
- 1) Strongly magnetised
 - 2) Repelled by magnetic force
 - 3) Sightly attracted by magnetic circuit
 - 4) None of the above

43. The current in capacitive circuits the voltage.
 1) Lags 2) Leads
 3) Inphase with 4) None of the above
44. When a Lead acid cell is re-charged
 1) The anode becomes dark chocolage brown colour
 2) Voltage raises
 3) Energy is absorbed by the cell
 4) All the above
45. An alternator having 20 poles and running at 300 r.p.m will generate AC whose frequency $f = \dots$
 1) 20 2) 50 3) 60 4) 300
46. Form factor of AC quantity is
 1) $E_{av} \div E_{ms}$ 2) $E_{ms} \div E_{av}$ 3) 1.11 4) 0.635
47. The true power in AC circuit $P = \dots$ watts
 1) EI 2) EI Sin ϕ 3) EI Cos ϕ 4) 1.2 EI Cos ϕ
48. The power consumed by a pure capacitive circuit is
 1) 1 W 2) 0.5 W 3) ∞ W 4) 0 W
49. A particle of charge Q and mass m travels through a potential difference V from rest. The final momentum of particle is
 1) $\frac{mv}{2}$ 2) $2Q\sqrt{mv}$ 3) $\sqrt{2mQv}$ 4) $\sqrt{2Q\frac{V}{m}}$
50. Three point charges of 0.67nc, 0.97nc and -0.35 nc are placed at the corners A, B & C of a square ABCD. Find what charge must be placed at D of the square so that the net potential at the center of the square is
 1) -1.29 nc 2) +1.29 nc 3) 1.99 nc 4) -1.99 nc
51. Two capacitors of 2 μ F and 3 μ F are connected in series across 10V. The potential difference across the 2 μ F capacitor will be
 1) 2V 2) 3V 3) 6V 4) 4V
52. A ray of monochromatic light is incident at an angle 49° on the first phase of an equilateral prism placed in minimum deviation position. Find the angle between the emergent and incident ray.
 1) 11° 2) 22° 3) 38° 4) 9°
53. Fringe width observed in a young's Double slit experiment in β . If the frequency of the source is doubled the fringe width will
 1) Become 2 β 2) Become 3 $\frac{\beta}{2}$ 3) Remain as 4) Become $\frac{\beta}{2}$
54. A 30V, 90W lamp is to be operated on a 120W D.C. line. For proper glow, a resistor of .. should be connected in series with the lamp
 1) 30 Ω 2) 40 Ω 3) 10 Ω 4) 20 Ω

55. A train in approaching a stationary listener on a Railway platform and the train whistles The apparent frequency of the whistle hear by the listener will be

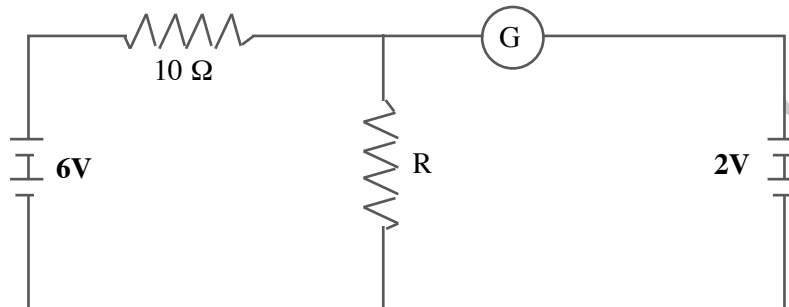
- 1) The same as the frequency of the whistle
- 2) More than the frequency of the whistle
- 3) Depend upon the temperature of the atmosphere
- 4) Less than the frequency of the whistle

56. In the circuit given here the voltmeter reads 4.5 volts. Calculate the resistance Voltmeter.



- 1) 1200 Ω
- 2) 1000 Ω
- 3) 1600 Ω
- 4) 1400 Ω

57. In the circuit given here the galvanometer reads zero. What must be the value of the resistance marked R.



- 1) 50 Ω
- 2) 75 Ω
- 3) 5 Ω
- 4) 10 Ω

58. At 1000° the Resistance of wire is found to be four times its Resistance at 0° C. Calculate the temperature coefficient or Resistance of the material of the wire.

- 1) 0.002/° C
- 2) 0.0011/° C
- 3) 0.004/° C
- 4) 0.003/° C

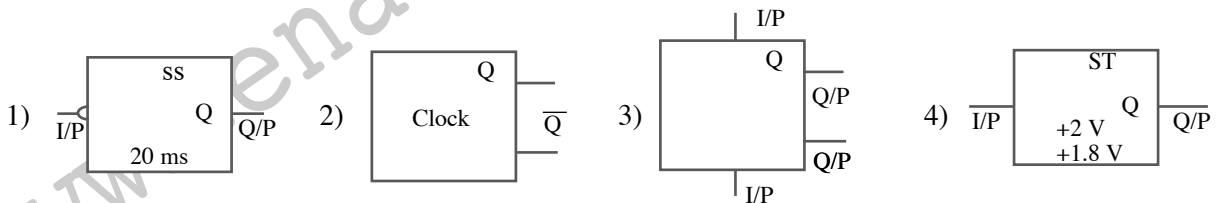
59. Four resistances of 15 Ω , 12 Ω, 4 Ω and 10 Ω respectively are connected in cyclic order the form a wheatsone n/w. What is the value Resistance to be connected in parallel with the Ω resistance to balance the n/w.

- 1) $\frac{1}{10}$ Ω
- 2) 10 Ω
- 3) 50 Ω
- 4) $\frac{1}{100}$ Ω

60. Doping of a semi conductor with small trace of impurity atoms generally changes the resistivity as follows.

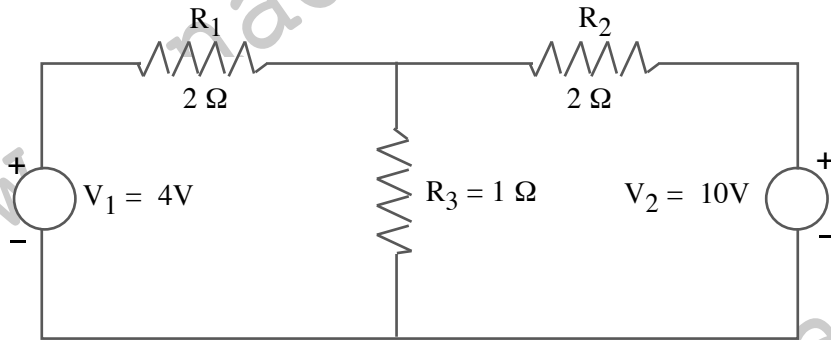
- 1) Decreases
- 2) Doesnot alter
- 3) Increases
- 4) May increase or decrease depending on the dopar

61. To get n type material from Germanium impurity to be added to the Germanium crystal
 1) Iridium 2) Boron 3) Aluminium 4) Arsenic
62. To make a Transistor to conduct, normally
 1) eb region to be reverse biases and cb region to be forward biased
 2) eb region to be forward biased no biasing voltage to the cb region
 3) cb region to be reverse biases and no biasing voltage to the eb region
 4) eb region to be forward biased and cb region to be reverse biased
63. A transistor has α 0.9. If the transistor is connected with its emmitter grounded, what will be change in collector current, if the change in base current in 3MA?
 1) 225 mA 2) 3mA 3) 27 mA 4) $\frac{1}{3}$ mA
64. To get square waves from distorted wave... is used
 1) Bistable Multivibrator 2) Schmitt Trigger circuit
 3) monostable Multivibrator 4) Astable Multivibrator
65. In all clocked Flip Flops, If at all any change in o/p occurs, it happens only in
 1) absence of clock pulse 2) toggling condition
 3) Set condition 4) None of these
66. in JK FF if J = 1, K = 1 and clock width is more it corresponds to
 1) Racing condition 2) Toggling condition
 3) Set condition 4) Reset Condition
67. In JK master slave flip flop the o/p of master changes during
 1) ??? 2) Full time of clock pulse
 3) Absence of clock pulse 4) None of these
68. In MOSFET if the drain is made +ve w.r.t source and no potential is applied to the Gte when two Ntype blocks and P substrate are there the drain current is
 1) Zero 2) Leakage Current
 3) Maximum 4) None of these
69. Symbol for monostable multivibrator is



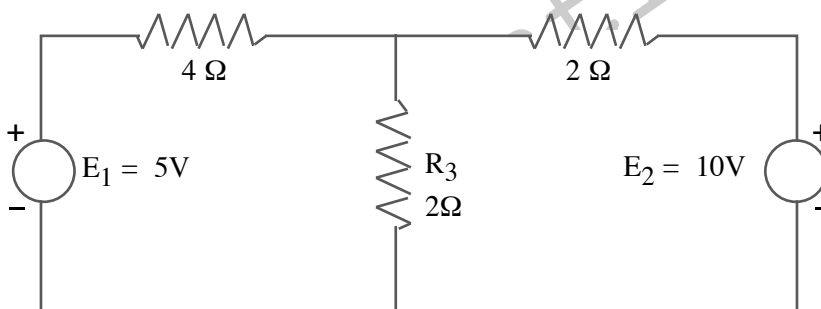
70. Simplified version of $[A.(AB)]$. (CD)
 1) AB + CD 2) AB + CD 3) AB + CD 4) AB + CD
71. The decimal number represented by the following BCD code 11000 01100000 is
 1) 12300 2) 1860 3) 606000 4) 14140

72. The Binary equivalent of $(170)_8$ is
 1) 1111000 2) 1110000 3) 1100100 4) None of these
73. Find the Decimal number of binary 110101.1011
 1) 53.6873 2) 51.6875 3) 53.6875 4) 53.6573
74. The value -44 is represented in signed magnitude scheme of the system as
 1) 1 0101100 2) 0 0101 100 3) -0101100 4) 01011001
75. In a positional number system the base is equal to the digit which represents the maximum value and
 1) +2 2) -1 3) +0 4) +1
76. Choose the binary value of decimal number 1.693
 1) 11010011101 2) 11001101101 3) 110100011001 4) 10110011101
77. The diminished radix complement of a decimal system is
 1) -9 2) 10 3) 9 4) -10
78. The value of current flowing through R_3 in the N/W given below is



- 1) 2.5 Amps 2) 3.5 Amps 3) $\frac{2}{7}$ Amps 4) 7 Amps

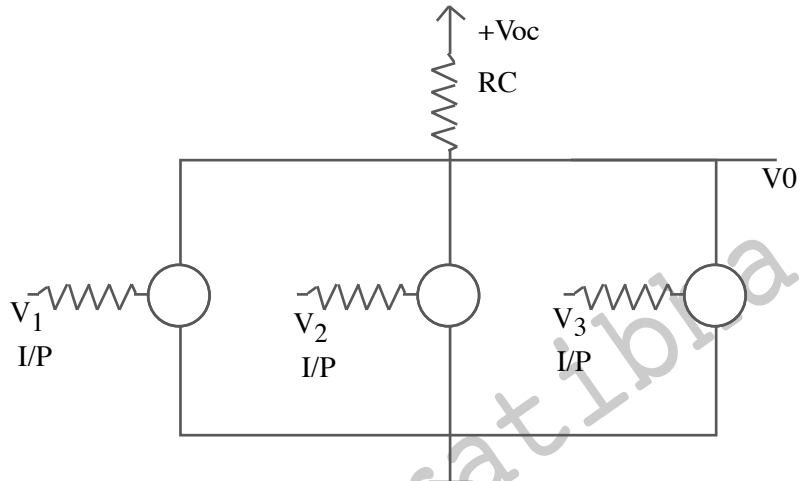
79. In the N/W shown in diagram the current flowing in $1\ \Omega$ Resistor is



- 1) ? 2) ? 3) ? 4) ?

80. The 9's complement of 376 is
 1) 628 2) 381 3) 363 4) 623
81. The 2's complement of 1010 is?
 1) 1010 2) 0101 3) 0110 4) 1011
82. The sum of the binary numbers 1110111.10 & 0100101.11 is
 1) 100110101.01 2) 10011101.01 3) 010100010.01 4) 10111101.01

83. The RTL given behaves like a gate



- 1) NAND 2) OR 3) NOR 4) AND

84. The difference of the binary numbers 10.00 and 1.11 is

- 1) 00.01 2) 01.01 3) 00.11 4) 01.11

85. The product of binary numbers 1101 and 101 is

- 1) 1000001 2) 1100001 3) 1101101 4) 1011101

86. $100011 \div 101$ is

- 1) 1101 2) 100 3) 110 4) 111

87. Product of binary numbers 1101.11 and 1.011 is

- 1) 10011.11101 2) 1000010.11101 3) 110101.11101 4) 100010.10101

88. $\frac{d}{dx} (\tan x) = \dots\dots$

- 1) $\tan x$, 2) $\sec x$ 3) $\sec 2x$ 4) $\sec x \tan x$

89. $\frac{d}{dx} (\sin^{-1} x) = \dots\dots$

- 1) $\cos^{-1} x$ 2) $-\cos^{-1} x$ 3) $-\frac{1}{\sqrt{1-x^2}}$ 4) $\frac{1}{\sqrt{1-s^2}}$

90. $\frac{d}{dx} (e^x) = \dots\dots$

- 1) e^x 2) $-e^x$ 3) $\log x$ 4) $\frac{1}{x}$

91. $\frac{d}{dx} (\log x) = \dots\dots\dots$

- 1) x 2) $\frac{1}{x}$ 3) $-x$ 4) $-\frac{1}{x}$

92. $\frac{d}{dx} (\sin 3x) = \dots\dots\dots$

- 1) $3 \sin x$ 2) $\sin 3x$ 3) $3 \cos x$ 4) $-3 \cos 3x$

93. The order of Differential Equation

$$\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3 + y = \dots$$

- 1) 0 2) 1 3) 2 4) 3

94. $\int \sin x \, dx = \dots$

- 1) $\cos x + C$ 2) $-\cos x + c$ 3) $\sin x + c$ 4) $-\sin x + c$

95. $\int \operatorname{Cosec}^2 x \, dx = \dots$

- 1) $-\cot x + c$ 2) $-\operatorname{Cosec} x + c$ 3) $\log \sin x + c$ 4) $\log \sec x + c$

96. $\int x^n \, dx = \dots$

- 1) $nx^n - 1 + C$ 2) $nx^n + C$ 3) $(n + 1)x^{n+1}$ 4) $\frac{x^{n+c}}{n+1} + C$

97. $\int e^x \, dx = \dots$

- 1) $e^x + C$ 2) $-e^x + C$ 3) $\log x + C$ 4) $\frac{1}{x} + C$

98. $\int \sin mx \, dx = \dots$

- 1) $m \sin mx$ 2) $\cos x$ 3) $-\cot^2 x$ 4) $-\operatorname{Cosec} x \cot x$

99. $\frac{d}{dx} (\operatorname{Cosec} x) = \dots$

- 1) $\sec x$ 2) $\cos x$ 3) $-\cot^2 x$ 4) $-\operatorname{Cosec} x \cot x$

100. A square matrix $A = [A_{ij}]$ is said to be skew-sym, metric, if it is equal to

- 1) Its tranpose
2) Negative of its transpose
3) Its inverse of transpose
4) Its negative inverse of transpose

ANSWERS

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