

**BSNL JTO Exam 2007**

**PART I**

1. Modern capacitors which have high capacitance in small size use a dielectric of  
(A) paper (B) rubber (C) ceramic (D) Mylar
2. The Maximum spectral response of the germanium and silicon is in the  
(A) infrared region (B) ultraviolet region (C) visible region (D) x-ray region
3. For an insulating material, dielectric strength and dielectric loss should be respectively  
(A) high and high (B) low and high (C) high and low (D) low and low.
4. In a distortion factor meter, the filter at the front end is used suppress  
(A) odd harmonics (B) even harmonics (C) fundamental component (D) dc component
5. The coefficient of coupling between two air core coils depends on  
(A) mutual inductance between two coils only (B) self inductances of the two coils only (C) mutual inductance and self inductances of the two coils (D) none
6. For a parallel plate capacitor which is being charged out of the following the incorrect statement is  
(A) Energy stored in the capacitor does not enter it through the connecting wire through the space around the wires and plates of capacitor.  
(B) Rate at which energy flows into this volume is equal to the integration of the poynting vector over the boundary of the volume between the plates.  
(C) The poynting vector points everywhere radially outward of the volume between plates.  
(D) The poynting vector points everywhere radially in to the volume between the plates.
7. The presence of alkali oxides in alumino silicate ceramics is likely to result in dielectric breakdown due to  
(A) Polarization (B) Conductivity (C) Structural homogeneties (D) Ionization

8. Which of the following will serve as a donor impurity in silicon  
(A) Boron (B) Indium (C) Germanium (D) Antimony
9. Electrical contact materials used in switches, brushes and relays must possess  
(A) high thermal conductivity and high melting point (B) Low thermal conductivity and low melting point  
(C) High thermal conductivity and low melting point (D) Low thermal conductivity and high melting point.
10. An SCR can only be turned off via its  
(A) cathode (B) anode (C) gates (D) none
11. Gold is often diffused into silicon PN junction devices to  
(A) increase the recombination rate (B) reduce the recombination rate  
(C) make silicon a direct gap semiconductor (D) make silicon semi-metal
12. With  $n$  nodes and  $b$  branches a network will have  
(A)  $(b+n)$  links (B)  $b - n + 1$  links (C)  $b - n - 1$  links (D)  $b + n + 1$  links
13. When a network has 10 nodes and 17 branches in all then the number of node pair voltages would be  
(A) 7 (B) 9 (C) 10 (D) 45
14. In any atom the potential energy of an orbiting electron is  
(A) always positive (B) always negative  
(C) sometime positive, sometime negative (D) numerically less than its kinetic energy.
15. A depletion MOSFET differs from a JFET in the sense that it has no  
(A) channel (B) gate (C) P-N junctions (D) substrate
16. The advantage of a semiconductor strain gauge over the wire round strain gauge is that

(A) it is more sensitive (B) it is more linear (C) it is less temperature dependent  
(D) it's cost is low

17. Barrier potential in a P-N junction is caused by

(A) thermally generated electrons and holes (B) diffusion of majority carriers  
across the junction

(C) migration of minority carriers across the junction (D) flow of drift current.

18. When an NPN transistor is properly biased then most of the electrons from the emitter

(A) recombine with holes in the base (B) recombine in the emitter itself

(C) pass through the base to the collector (D) are stopped by the junction barrier

19. The depletion voltage for silicon diode at  $\mu_0$  bias is

(A) 0.5 volt (B) 0.3 volt (C) 0.7 volt (D) 1.1 volt

20. A UJT can

(A) be triggered by any one of its three terminals (B) not be triggered

(C) be triggered by two of its three terminal only (D) be triggered by all of its  
terminals only.

21. The energy of electric field due to a spherical charge distribution of radius  $r$  and  
inform charge density in vacuum is

A  $1.8 \times 10^9 \frac{Q^2}{r}$  where  $Q = \frac{4}{3} \pi r^3 \sigma$

B  $5.4 \times 10^9 \frac{Q^2}{r}$  where  $Q = \frac{4}{3} \pi r^2 \sigma$

C  $5.4 \times 10^9 \frac{Q^2}{r}$  where  $Q = \frac{4}{2} \pi r^3 \sigma$

D  $\frac{1}{4\pi \epsilon_0} \times 0.6 \left( \frac{4}{3} \pi r^2 \sigma \right) \frac{1}{R}$

22. Maxwells divergence equation for the magnetic field is given by

- A.  $\nabla^* \cdot \vec{B} = 0$       B.  $\nabla \cdot \vec{B} = 0$   
 C.  $\nabla^* \cdot \vec{B} = p$       D.  $\nabla \cdot \vec{B} = p$

23. When a short grounded vertical antenna has a length  $L$  which is  $0.05 \lambda$  at frequency  $f$  and if its radiation resistance at  $f$  is  $R$  Ohms, then its radiation resistance at a frequency  $2f$  will be

- (A)  $R/2$  ohms    (B)  $R$  ohms    (C)  $2R$  ohms    (D)  $4R$  ohms

24. In a cylindrical cavity resonator, the two modes which are degenerate would include

- (A)  $TE_{111}$  and  $TM_{111}$     (B)  $TE_{011}$  and  $TM_{011}$     (C)  $TE_{022}$  and  $TM_{111}$     (D)  $TE_{111}$  and  $TM_{011}$

25. When an antenna of input resistance  $73$  ohm is connected to a  $50$ -ohm line and if the losses are ignored then its efficiency will be nearly

- (A)  $0.19$     (B)  $0.81$     (C)  $0.97$     (D)  $1.19$

26. The transformer utilization factor of full wave bridge rectifier is

- (A)  $0.812$     (B)  $0.286$     (C)  $0.693$     (D)  $0.782$

27. When a dominant mode wave guide not terminated in its characteristic impedance is excited with a  $10$  GHz signal

then if  $d$  is the distance between two successive minima of the standing wave in the guide then

- (A)  $d = 1.5$  cm    (B)  $d$  is less than  $1.5$  cm    (C)  $d$  is greater than  $1.5$  cm    (D)  $d = 3$  cm

28. A two port network having a  $6$  dB loss will give

(A) an output power which is one - quarter of the input power    (B) an output power which is one - half of the input power

(C) an output voltage which is  $0.707$  of the input voltage.    (D) an output power which is  $0.707$  of the input power.

29. While transporting a sensitive galvanometer

(A) the terminals are kept shorted (B) critical damping resistance is connected across the terminals

(C) the terminals are kept open circuited (D) it does not matter as to what is connected across the terminals.

30. A T type attenuator is designed for an attenuation of 40 dB and terminating resistance of 75 ohms.

Which of the following values represent full series arm  $R_1$  and shunt arm  $R_2$ ?

1.  $R_1 = 147 \Omega$  2.  $R_1 = 153 \Omega$  3.  $R_1 = 1.5 \Omega$  4.  $R_1 = 3750 \Omega$

(A) 1 and 3 (B) 1 and 4 (C) 2 and 3 (D) 2 and 4

31. For a transmission line, the characteristic impedance with inductance  $0.294 \mu\text{H/m}$  and capacitance  $60\text{pF/m}$  is

(A)  $49 \Omega$  (B)  $60 \Omega$  (C)  $70 \Omega$  (D)  $140 \Omega$

32. When the graph of a network has six branches with three tree branches then the minimum number

of equations required for the solution of the network is

(A) 2 (B) 3 (C) 4 (D) 5

33. Consider the following statement for a 2-port network

1.  $Z_{11} = Z_{22}$  2.  $h_{12} = h_{21}$  3.  $Y_{12} = -Y_{21}$  4.  $BC - AD = -1$

then the network is reciprocal if and only if

(A) 1 and 2 are correct (B) 2 and 3 are correct (C) 3 and 4 are correct (D) 4 alone is correct.

34. As a network contains only independent current sources and resistors then if the values of all

resistors are doubled then the values of the node voltages are

(A) will become half (B) will remain unchanged

(C) will become double (D) cannot be determined unless the circuit configuration and the values of the resistors are known.

35. A iron cored choke is a

(A) Linear and active device (B) Non linear and passive device (C) Active device only (D) Linear device only

36. Poynting vector wattmeter is based on

(A) Seebeck effect (B) Ferranti effect (C) Induction effect (D) Hall effect

37. Which one of the following is not a transducer in the true sense?

(A) Thermocouple (B) Piezoelectric pick-up (C) Photo voltaic cell (D) LCD.

38. The term used to denote a static device that converts ac to dc, dc to ac, dc to dc or ac to ac is

(A) Converter system (B) Inverter (C) Chopper (D) Thyristor

39. When a dipole antenna of  $1/8$  length has an equivalent total resistance of 1.5 Watt then the efficiency of the antenna is

(A) 0.89159% (B) 8.9159% (C) 89.159% (D) 891.59%

40. In commercial FM broadcasting, the maximum frequency deviation is normally

(A) 5 KHz (B) 15 KHz (C) 75 KHz (D) 200 KHz

41. Weins bridge is used for measurement of frequency in the applied voltage waveform is measurement of frequency in the applied voltage waveform is

(A) sinusoidal (B) square (C) rectangular (D) triangular

42. Strain gauge is

(A) not a transducer (B) an active transducer (C) not an electronic instrument

43. A high  $Q$  coil has

(A) large band width (B) high losses (C) low losses (D) flat response

44. In the case of an instrument reading of 8.3 V with a 0 to 150 voltmeter having a guaranteed accuracy of 1% full scale reading, the percentage limiting error is

(A) 1.810% (B) 0.181% (C) 12.45% (D) 0.0018%

45. The 'h' parameter equivalent circuit of a junction transistor is valid for  
(A) High frequency, large signal operation (B) High frequency, small signal operation (C) Low frequency, large signal operation.
46. A system is causal if the output of any time depends only on  
(A) Values of input in the past and in the future (B) Values of input at that time and in the past  
(C) Values of input at that time and in the future (D) none
47. From the hot metal surface electrons escape because  
(A) of change of state from metal to gas due to heat. (B) of change of state from gas to metal  
(C) the energy supplied is greater than the work function (D) the energy is greater than Fermi level
48. The most common device used for detection in radio receivers is  
(A) amplifier (B) triode (C) diode (D) transistor
49. In a full wave rectifier the negative point in a circuit is  
(A) cathode (B) anode (C) The central tap on the high voltage secondary (D) plate.
50. Negative feedback amplifier has a signal corrupted by noise as its input. The amplifier will  
(A) Amplify the noise as much as the signal (B) Reduce the noise (C) Increase the noise  
(D) Not effect the noise

## **PART - II**

51. It is an unidirectional device that blocks the current flow from cathode to anode  
(A) SCR (B) PCR (C) VCR (D) DCR
52. An ideal constant current source is connected in series with an ideal constant voltage source. Considering together the combination will be a

(A) constant voltage source (B) constant current source

(C) constant voltage and a constant current source or a constant power source. (D) resistance

53. Anode current in a thyristor is made up of

(A) electrons only (B) electrons or holes (C) electrons and holes (D) holes only

54. For a pulse transformer, the material used for its core and the possible turn ratio from primary to secondary are respectively

(A) ferrite : 20 : 1 (B) laminated iron : 1 : 1 (C) ferrite : 1 : 1 (D) powdered iron : 1 : 1

55. A converter which can operate in both 3 pulse and 6 pulse mode is a

(A) 1 phase full converter (B) 3 phase half wave converter (C) 3 phase semi converter (D) 3 phase full converter.

56. A single phase CSI has capacitor C as the load. For a constant source current, the voltage across the capacitor is

(A) square wave (B) triangular wave (C) step function (D) pulsed wave

57. A single phase full wave midpoint thyristor converter uses a 230/200V transformer with centre tap

on the secondary side. The P.I.V per thyristor is

(A) 100V (B) 141.4V (C) 200V (D) 282.8V

58. In dc choppers for chopping period T, the output voltage can be controlled by FM by varying

(A) T keeping  $T_{on}$  constant (B)  $T_{on}$  keeping T constant

(C)  $T_{off}$  keeping T constant (D) None of the above

59. An ideal power supply consists of

(A) Very small output resistance (B) Zero Internal resistance

(C) Very large input resistance (D) Very large output resistance

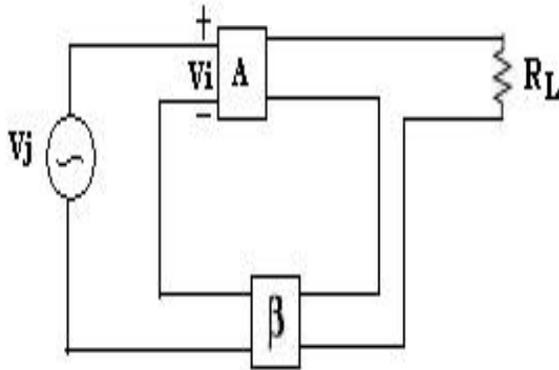
60. The linearity error for a digital input is indicated by

(A)  $\xi$  (B)  $\gamma$  (C)  $\eta$  (D)  $\varepsilon$

61. In the 8421 BCD code the decimal number 125 is written as

(A) 1111101 (B) 0001 0010 0101 (C) 7D (D) None of the above

62. Match the given feedback circuit with its proper nomenclatures



(A) Current series feedback (B) Current shunt feedback

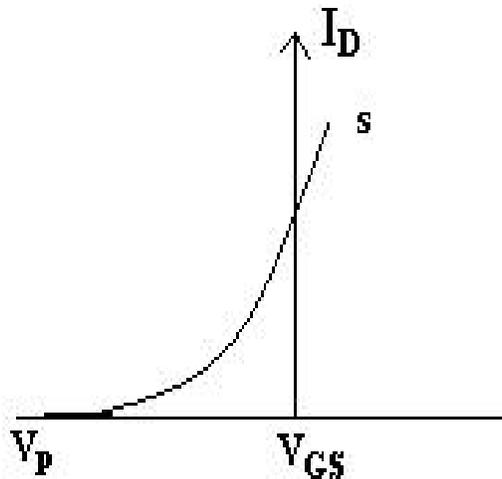
(C) Voltage series feedback (D) Voltage shunt feedback

63. Class A amplifier is used when

(A) No phase inversion is required (B) Highest voltage gain is required

(C) dc voltages are to be amplified (D) Minimum distortion is desired.

64. Identity the correct match for the given transistor



(A) Enhancement type P channel MOSFET (B) Depletion type N channel MOSFET

(C) Enhancement type N channel MOSFET (D) Depletion type P channel MOSFET

65. In case a signal band limited to fermimeter is sampled at a rate less than 2 fermimeter, the constructed signal will be

(A) Distortionless (B) Small in amplitude (C) Having higher frequencies suppressed (D) Distorted

66. IC which has quad 2 input AND gates

(A) 7411 (B) 7404 (C) 7400 (D) 7408

67. Registers in which data is entered or taken out in serial form are referred as

(A) left shift register (B) right shift register (C) shift registers (D) none of the above

68. The expression  $ABC$  can be simplified to

A.  $\overline{A} \overline{B} \overline{C}$  B.  $AB+BC+CA$

C.  $AB+\overline{C}$  C.  $\overline{A} + \overline{B} + \overline{C}$

69. Read the following

(i) Routh Herwitz's criterion is in time domain

(ii) Root locus plot is in time domain

(iii) Bode plot is in frequency domain

(iv) Nyquist criterion is in frequency domain.

(A) 2,3 and 4 are correct (B) 1,2 and 3 are correct (C) 3 and 4 are correct (D) all four are correct

70. Register and counters are similar in the sense that they both

(A) count pulses (B) store binary operation (C) shift operation

(D) made from an array of flip flops and gates integrated on a single chip.

71. In  $D/A$  converter, the resolution required is 50mv and the total maximum input is 10v. The number of bits required is

(A) 7 (B) 8 (C) 9 (D) 200

72. On different unit impulse function results in

(A) Unit parabolic function (B) Unit triplet (C) Unit doublet (D) Unit ramp function

73. .... watt of power is received from sun per  $m^2$  surface area of a geosynchronous satellite

(A) 100 (B) 500 (C) 2000 (D) 1000

74. The ripple factor in an LC filter.

(A) Increases with the load current (B) Increases with the load resistance

(C) Remains constant with the load current (D) Has the lowest value

75. In different parts of the country identical telephone numbers are distinguished by their

(A) Language digits (B) Access digits (C) Area codes (D) Central office codes

76. Amplitude modulation is used for broadcasting because

(A) it is more noise immune than other modulation systems

(B) compared with other systems it requires less transmitting power

(C) its use avoids receiver complexity

(D) no other modulation system can provide the necessary bandwidth for high fidelity.

77. The maximum phase shift that can be provided by a lead compensator with transfer function.

$$G_0(S) = \frac{1+6S}{1+2S}$$

(A)  $15^\circ$  (B)  $45^\circ$  (C)  $30^\circ$  (D)  $60^\circ$

78. The correct sequence of steps required to improve system stability is

- (A) Insert derivative action, use negative feedback, reduce gain
- (B) Reduce gain, use negative feedback, insert derivative action
- (C) Reduce gain, insert derivative action, use negative feedback
- (D) Use negative feedback, reduce gain, insert derivative action,

79. Identify slope change at  $\omega = 10$  of the magnitude v/s frequency characteristic of a unity feedback system with the following open-loop transfer function.

$$G(j\omega) = \frac{5(1+j0.1\omega)}{j\omega(1+j0.5\omega) \left( \left(1+j\frac{\omega}{50}\right) + \left(\frac{j\omega}{50}\right)^2 \right)}$$

- A -80 dB/dec to -60 dB/dec
- B 40 dB/dec to 20 dB/dec
- C 20 dB/dec to -40 dB/dec
- D 40 dB/dec to -20 dB/dec

80. In the feedback control system the loop transfer function is given by

$$G(s)H(s) = \frac{K}{S(s+2)(s^2+2s+2)}$$

Number of asymptotes of its root loci is

A. 1 B. 2 C. 3 D. 4

81. In a closed - loop transfer function

$$\frac{G(s)}{H(s)} = \frac{2600 k(s+25)}{s^4+125s^3+5100s^2+65000s+65000 k}$$

A.  $\pm j228$  B.  $\pm j2.28$  C.  $\pm j1.14$  D.  $j114$

82. Considering the following statement : In a magic tee

1. the collinear arms are isolated from each other
2. one of the collinear is isolated from the E-arm
3. one of the collinear arm is isolated from the H-arm
4. E-arm and H-arm are isolated from each other. Of these statements

(A) 1 and 2 are correct (B) 1 and 3 are correct (C) 1 and 4 are correct (D) 2 and 3 are correct.

83. In 1965 first geostationary satellite was launched called

(A) ANIK (B) EARLY BIRD (Intel sat - 1) (C) WESTAR (D) MOLNIYA

84. When  $A = 0$ ,  $B = 0$ ,  $C = 1$  then in two input logic gate we get gate

(A) XOR gate (B) AND gate (C) NAND gate (D) NOR gate

85. In a radio receiver the IF amplifier

(A) is tuned above the stations incoming frequency (B) amplifies the output of local oscillator

(C) is fixed tuned to one particular frequency (D) can be tuned to various isolate frequencies

86. A duplexer is used to

(A) Couple two antennas to a transmitter without interference

(B) isolate the antenna from the local oscillator

(C) prevent interference between two antennas connected to a receiver

(D) use an antenna for reception or transmission without interference.

87. Boolean algebra is based on

(A) numbers (B) logic (C) truth (D) symbols

88. The amplifiers following the modulated stage in a low level modulation AM system be

(A) linear amplifier (B) harmonic generators (C) class C power amplifiers (D) class untuned amplifiers

89. In a radar system maximum unambiguous range depends on

(A) maximum power of the transmitter (B) pulse repetition frequency  
(C) width of the transmitted pulse (D) sensitivity of the radar receiver.

90. In composite video waveform the function of the serrations, is to

(A) equalize the charge in the integrator before the start of vertical retrace  
(B) help vertical synchronization (D) simplify the generation of the vertical sync pulse

91. The frequency range 30MHz - 300MHz is

(A) medium frequency (B) very high frequency (C) super high frequency (D) Infrared frequency

92. Which wave cannot exist inside wave guide

(A) TE (B) TM (C) TEM (D) HE

93. Ionosphere layer of earth is situated at

(A) upto 18 kms from earth (B) from 18 to 70 km (C) 70 to 500 km (D) above 500km

94. A two cavity klystron tube is a

(A) velocity modulated tube (B) frequency modulated tube  
(C) Amplitude modulated tube (D) simple triode

95. As the thermal noise get doubled due to the increase in a resistance the noise power get.

(A) doubled (B) quadruped (C) unchanged (D) halved.

96. Which one is a cross field tube

(A) Klystron (B) Reflex Klystron (C) Magnetron (D) TWT

97. The degree of coupling depends

(A) size of hole (B) location of holes (C) size and location of holes (D) not depend on size or location of hole

98. The thermal noise depends on

(A) direct current through device  
(B) resistive component of resistance  
(C) reactive component of impedance  
(D) load to connected.

99. The charge on a hole is

(A)  $1.6 \times 10^{-9}$  (B)  $1.6 \times 10^{-19}$  (C)  $1.6 \times 10^1$  (D)  $1.6 \times 10^{20}$

100. Intel's 8085 microprocessor chip contains

(A) seven 8 bit registers (B) 8 seven bits registers (C) seven 7 bit registers (D) eight 8 bit registers.

### **PART III**

101. The words Satyameva Jayathe' have been taken from

(A) Vedas (B) Bhagavad Gita (C) Mundaka Upanishada (D) Mahabharatha (E) None of these

102. Which of the following countries was the first to develop a neutron bomb?

(A) USA (B) USSR (C) China (D) Pakistan

103. "Kathakali" dance is connected with

(A) Kerala (B) Rajasthan (C) Uttar pradesh (D) Tamil Nadu

104. The term "Ashes" is associated with

(A) Hockey (B) Cricket (C) Soccer (D) None of these.

105. The Kailash Temple at Ellora is a specimen of

(A) Gupta architecture (B) Rashtrakutlas architecture (C) Chalukya architecture (D) Chola architecture

106. When the two Houses of Parliament differ regarding a Bill then the controversy is solved by

- (A) Joint sitting of the two Houses
- (B) President of India
- (C) Prime Minister of India
- (D) BY a special committee for the purpose

107. Which of the following is not work of kalidasa?

- (A) Meghdood (B) Reghuvansha (C) Sariputra Prakarma (D) Ritushamhara

108. Amir Khusro was the famous poet and aesthete of

- (A) Akbar the Grest (B) Mahmud Ghaznvi (C) Snah Jahan (D) Alauddin Khilji

109. With the beginings of space travel, we entered a new

- (A) Era of great history (B) List (C) Book (D) Year

110. An though it mourns the death of someone, need not be sad.

- (A) Funny poem (B) Newspaper article (C) Othodox talk (D) Elegy

111. If stare is glance so gulp is

- (A) Sip (B) Tell (C) Salk (D) Admire

112. He hardly works means

- (A) The work is hard (B) He is hard (C) The work is easy (D) He work very little.

113. Give the opposite word for pulchritude

- (A) antipathy (B) unsightliness (C) inexperience (D) languor

114. Nanometre is ..... part of metre

- (A) Millionth (B) Ten Millionth (C) Billionth (D) Ten billionth

115. Malaria affects

- (A) Liver (B) Spleen (C) Intestine (D) Lungs

116. Sindhu Rakshak is a /an

A) Aircraft carrier (B) Submarine (C) Multiple purpose fighter (D) Anti-aircraft gun

117. With which subject is " Dada Saheb Phalke Award" associated.

(A) Best film director

(B) Best musician

(C) Best documentary

(D) Best work relating to promotion of Indian film industry

118. Who developed the branch of mathematics known as Calculus?

(A) Arybhata (B) Newton (C) Einstein (D) Archimedes

119. In which state in Kanha Part situated?

(A) M.P (B) U.P (C) Assam (D) W.Bengal

120. Which day is observed as Human Rights Day?

(A) 24th October (B) 4th July (C) 8th August (D) 10th December

**ANSWERS**

1. (C) 2. (B) 3. (C) 4. (C) 5. (C) 6. (C) 7. (B) 8.(D) 9. (A) 10. (B)  
11. (B) 12.(B) 13. (B) 14. (B) 15. (C) 16.(A) 17. (C) 18. (C) 19. (C)  
20. (C) 21. (C) 22. (B) 23. (D) 24. (D) 25.(B) 26.(B) 27.(A) 28.(A)  
29. (B) 30.(A) 31. (C) 32. (B) 33.(D) 34. (C) 35. (B) 36. (C) 37. (D)  
38. (A) 39(C) 40.(C) 41. (A) 42. (B) 43.(C) 44. (C) 45.(C) 46.(B)  
47. (C) 48. (C) 49. (C) 50. (B) 51. (A) 52. (B) 53. (C) 54. (C) 55. (C)  
56. (B) 57. (D) 58. (A) 59. (B) 60. (D) 61.(A) 62. (A) 63. (D) 64. (B)  
65. (D) 66. (D) 67. (C) 68. (D) 69 (D) 70. (D) 71. (B) 72. (C) 73. (D)  
74 (D) 75. (C) 76. (C) 77.(C) 78. (D) 79. (A) 80. (D) 81. (A) 82. (C)  
83. (C) 84. (C) 85. (C) 86. (C) 87. (B) 88. (C) 89.(B) 90. (C) 91.(B)  
92. (C) 93. (C) 94. (A) 95. (C) 96. (C) 97. (B) 98. (B) 99. (B) 100. (A)  
101. (A) 102. (A) 103. (A) 104. (B) 105. (D) 106. (C) 107. (D) 108. (A)  
109. (A) 110. (D) 111. (A) 112. (D) 113. (B) 114. (B) 115. (B) 116. (D)  
117. (C) 118. (C) 119. (B) 120. (A).