

BHEL Model question paper(Answers Updated)

1. For ELECTRICAL & ELECTRONICS with answers(bolded words)
2. When a inductive coil connected to a 200 V, 50Hz ac supply with 10A current flowing through it dissipates 1000 watts then which of the following will have least value in ohms
 - a.) Resistance
 - b.) Reactance
 - c.) Impedance
 - d.) None
3. Oscillator crystal are made of –
 - a.) Silicon
 - b.) Germanium
 - c.) Quartz
 - d.) None
4. For small size, high frequency coils, the most common core material is-
 - a.) Air
 - b.) Ferrite
 - c.) Powdered iron
 - d.) Steel
5. If we have a parallel plate capacitor of plate area 'A' and plate separation t and having a capacity C and a metallic plate r of area A and of negligible thickness is introduced in the capacitor at a distance x from either of the two plates as shown in the given figure then the capacity of the capacitor will become –
 - a.) C
 - b.) C
 - c.) $2C$
 - d.) $4C$
6. A superconductor is a –
 - a.) A material showing perfect conductivity and Meissner effect below a critical

temperature

b.) A conductor having zero resistance

c.) A perfect conductor with highest di-magnetic susceptibility

d.) A perfect conductor which becomes resistance when the current density through it exceeds a critical value

7. When an inductor tunes at 200 KHz with 624 pF capacitor and at 600 KHz with 60.4 pF capacitor then the self capacitance of the inductor would be –

a) 8.05 pF

b) 10.05pF

c.) 16.01pF

d.) 20.01pF

8. Sparking occur when a load is switched off because the circuit has high –

a.) Inductance

b.) Capacitance

c.) Resistance

d.) None

9. Sparking between contacts can be reduced by inserting a –

a.) Resistance in the line

b.) Capacitor in series with contacts

c.) Capacitor in parallel with contacts

d.) None

10. RF amplifier of an A.M. receiver is normally biased in –

a.) Class 'A'

b.) Class 'b'

c.) Class 'C'

d.) None

11. The value of gate voltage for the operation of enhancement of only N channel MOSFET has to be –

a.) High positive

b.) High negative

c.) Low positive

d.) Zero

12. The input gate current of a FET is –

a.) a few microamperes

b.) negligibly small

c.) a few milliamperes

d.) a few amperes

13. In the following fig. with $R = 30k$, the value of current through 2 K resistor is –

a.) 25 mA

b.) 40 mA

c.) 25/16 mA

d.) 10 mA

14. A step recovery diode –

a.) has on extremely short recovery time

b.) conducts equally well in both directions

c.) is mainly used as a harmonic generator

d.) is an ideal rectifiers of high frequency signals

15. In order to get maximum undistorted output signal from CE amplifier with $V_{CC} 10V$, the value of $V_{CE(Q)}$ should be approximately a.)

0.1V

b.) 5V

c.) 10V

d.) V

16. In a FET the electrode, which corresponds to collector in bipolar transistor, is –

a.) source

b.) drain

c.) gate

d.) none

17. The device which acts like an NPN and a PNP transistor connected base to base and emitter to collector is – a.) Triac b.) UJT

c.) Diac

d.) SCR

18. A typical optical fibre has –

a.) High refractive index core and low refractive index cladding

b.) Low refractive index core and high refractive index cladding

c.) Both a and b

d.) None

19. In the following figure circuit diagram of an op-amp based is shown. The ratio is equal to –

a.) 9

b.) 11

c.) 10

d.) 21

20. When a loud speaker is connected across the terminals A and B of the network shown in the fig. then its impedance to obtain maximum power dissipation in it will be –

- a.) $3 - j1$
- b.) $3 + j9$
- c.) $7.5 + j 2.5$
- d.) $7.5 - j 2.5$

21. In the lattice network, the value of R for the maximum power transfer to the load –

- a.) 5
- b.) 6.5
- c.) 8
- d.) 9

22. For a lossy transmission line short circuited at the receiving end, the input impedance is given by (Z_0 is the characteristic impedance, γ is the propagation constant and l is the length of the line- a.) $Z_0 \cot h \gamma l$ b.) $Z_0 \cot \gamma l$

- c.) $Z_0 \tan h \gamma l$
- d.) $Z_0 \tan \gamma l$

23. The approximate thickness of the radome wall should be – a.) $\lambda/4$

- b.) $\lambda/2$
- c.) $\lambda/2$
- d.) $\lambda/8$

24. A relatively permanent information is stored in

- a.) ROM
- b.) RAM
- c.) PROM
- d.) Volatile memory

25. The rise time of the RC network shown in the given figure is approximately equal to –

- a.) RC
- b.) RC
- c.) $2RC$

d.) $4RC$

26. If in the network shown in the fig. initially a steady state is attained by closing the switch 's' and then if the switch is opened at $t = 0$, then the current $i(t)$ through the inductor will

be – a.) $\cos 50tA$

b.) $2A$

c.) $2\cos 100tA$

d.) $2\sin 50tA$

27. When the network of figure – I and T-network of figure – II are equivalent then the values of R_1 , R_2 and R_3 will be respectively – a)

$9_, 6_ \text{ and } 6_$

b.) $6_ , 6_ \text{ and } 9_$

c.) $9_ , 6_ \text{ and } 9_$

d.) $6_ , 9_ \text{ and } 6_$

28. When the impedance matrices of a two port networks are given by and , then if these two networks are connected in series then the impedance matrix of the resulting two-port network will be –

d.) indeterminate

29. Joule/coulomb is the unit of - a.) Electric field potential b.) Potential

c.) Charge

d.) None of the above

30. The electric field line and equipotential lines a.)

Are parallel to each other

b.) Are one and same

c.) Cut each other orthogonally

d.) Can be inclined to each other at any angle

31. For a lossy transmission line short circuited at the receiving end, the input impedance is given by (When Z_0 is the characteristic impedance γ is the propagation constant and L is the length of the line)

32. When two equal positive point charges are placed along X- axis at X_1 and $-X_1$ respectively then the electric field vector at a point P on the positive Y-axis will be directed a.)

In the +x direction

b.) In the -x direction

c.) In the +y direction

d.) In the -y direction

33. The directions of \mathbf{E} and \mathbf{H} in TEM mode transmission line with respect to the direction of propagation are a.)

Both \mathbf{E} and \mathbf{H} are transverse to the direction of propagation

b.) \mathbf{E} and \mathbf{H} are transverse and \mathbf{H} has a component in the direction of propagation

c.) \mathbf{E} is entirely transverse and \mathbf{H} has a component in the direction of propagation

d.) \mathbf{E} is entirely transverse and \mathbf{H} has a component in the direction of propagation

34. The lowest TM mode in a rectangular waveguide of cross-section $a \times b$ with $a > b$ will be a.)

TM₀₁

b.) TE₁₀

c.) TM₁₁

d.) TE₁₁

35. When a transmitter in a free space radiates a mean power of 'p' watts uniformly in all directions then at a distance d sufficiently far from the source in plane the electric field E should be related to p and d as –

36. . When a dipole antenna was radiating with some excitation in free space radiating a

certain amount of the power P if then this antenna is immersed in a lake where water is non-dissipative but has a dielectric constant of 81, then the radiated power with the same excitation will be

a.) Decrease to finite non-zero value

b.) Remain the same

c.) Increase

d.) Decrease to zero

37. When a $(75 - j40)\ \Omega$ load is connected to a coaxial line of $Z_0 = 75\ \Omega$ at 6MHz then the load matching on the line can be accomplished by connecting a.)

A short – circuited stub at the load

b.) An inductance at the load

c.) A short circuited stub at a specific distance from the load

d.) none of the above

38. As compared to analog multimeters, digital multimeters are – a.) less accurate b.) more accurate

c.) equally accurate

d.) none.

39. When a signal of 10 mV at 75 MHz is to be measured then which of the following instruments can be used – a.) VTVM b.) Cathode ray oscilloscope

c.) Moving iron voltmeter

d.) Digital multimeter

40. Which of the following statement is true about two wattmeter method for power measurement in three phase current ? a.) power can be measured using two wattmeter method only for star connected three phase circuits. b.) when two meter show identical readings, in the power factor is 0.5.

c.) when power factor is unit, one of the wattmeter reads zero

d.) when the reading of the two wattmeters are equal but of opposite sign, then the power factor is zero –

41. When a capacitance transducer has two plates of area 5cm^2 each, separated by an air gap of 2mm then the displacement sensitivity in pf/cm due to gap change would be –a.)

11.1b.) 44.2

c.) 52.3

d.) 66.3

42. The Q of a radio coil –a.) is independent of frequencyb.) increases monotonically as frequency increases

c.) decreases monotonically as frequency increases

d.) increases upto a certain frequency and then decreases beyond that frequency

43. When a generator of internal impedance and operating at 1GHz feeds a load via a coaxial line of characteristic impedance $50\ \text{ohm}$ then the voltage wave ratio on the feed line is –a.) 0.5b.) 1.5

c.) 2.5

d.) 1.75

44. The coding system typically used in digital telemetry is –a.) PPM (pulse position modulation)b.) PAM (pulse amplitude modulation)

c.) PCM (pulse code modulation)

d.) PDM (pulse duration modulation)

45. Radiation pyrometers are used for the measurement of temperature in the range of –

a.) -2000C to 5000C

b.) 00C to 5000C

c.) 5000C to 12000C

d.) 12000C to 25000C

46. In the given figure band structure is shown. It is of –

a.) Gallium Arsenide (GaAs)

b.) Silicon (Si)

c.) Copper (Cu)

d.) Germanium (Ge)

47. When anode is positive with respect to cathode in an SCR, the numbers of blocked p-n junction is –

a.) 1

b.) 2

c.) 3

d.) 4

48. The circuit symbol for a GTO is

a. b.

c. d.

49. In the given fig. mark out the type of Cyclo converters

a.) 1 phase to 1 phase with continuous conduction

b.) 1 phase to 1 phase with discontinuous conduction

c.) step up device

d.) 3 phase to 1 phase device

In the given fig. A-1, $C=5$, m H and $C=20$ m F, C is initially charged to 200 V. After the switch.

S is closed at $t = 0$ the

maximum value of current and the

time at which it reaches this value are respectively.

a.) 400 A, 15.707 mS

50. b.) 50 A, 30 mSc.) 100 A, 62.828 mSd.) 400 A, 31.414 mS

51. 50. In the given circuit the maximum current in the main SCR M can be a.)

200 A

b.) 170.7 A

c.) 141.4 A

d.) 70.7 A

52. The transfer function of an amplifier is given by The

high 3-dB frequency of the amplifier will approximately

a.) 5850 KHZ

b.) 585 KHZ

c.) 5850 HZ

d.) 585 HZ

53. In comparison to full wave rectifier with two diodes the four diode bridge rectifier has

the dominant advantage of -

a.) Higher current carrying

b.) Lower ripple factor

c.) Higher efficiency

d.) Lower peak inverse voltage require

54. Power output increase in a class-C amplifier a.)

If the conduction angle decrease

b.) If the conduction angle increase

c.) Are not governed by the conduction angle

d.) None of the above

55. A transistor with $h_{ie} = 1.5 \text{ k}$ and $h_{fe} = 75$ is used in an emitter follower circuit where R_1

and R2 are used for normal biasing . Approximate value of it's current amplification is a.)

75b.)76

c.)75/76

d.)-75

56. Amplifier of class B has high theoretical efficiency of 78.5 percent because a.)

It is biased almost to saturation

b.)Its quiescent current is low

c.)It's output is an exact replica of it's input

d.)It is biased well below cut off

57. The coupling that produces minimum interference with frequency response is a.)

Direct coupling

b.)Impedance coupling

c.) R C coupling

d.)Transformer coupling

58. In the circuit shown in the given figure Rf provides

a.) Current series feedback

b.)Current shunt feedback

c.) Voltage series feedback

d.)Voltage shunt feedback

59. Mark the correct relation for the junction transistor

60. Data in the serial form can be converted into parallel form by using –a.) PISO shift

registerb.) SOIP shift register

c.) SIPO shift register

d.) POIS shift register

61. PROMs are used to store-a.) bulk informationb.) information to be accessed rarely

c.) sequence information

d.) relatively permanent information

62. The horizontal axis in a 3 bit unipolar D/A converter represents-

a.) Output bit combination

b.) analog output voltage

c.) input bit combination

d.) none of the above

63. 'Not allowed' condition in NAND gate SR flip flop is -

a.) $s = 0, R = 0$

b.) $s = 1, R = 1$

c.) $s = 0, R = 1$

d.) $s = 1, R = 0$

64. Name the fastest logic family-

a.) TTL

b.) RTL

c.) DCTL

d.) ECL

65. Equation corresponding to De Morgan's theorem in Boolean Algebra is -

a.) $(A+B) = \overline{A} \overline{B}$

b.) $(A+B) = \overline{A} + \overline{B}$

c.) $A + AB = A$

d.) None of the above

66. In the given fig find radix of the system -

a.) 2

b.) 4

c.) 6

d.) 8

67. Modems are used for data transmission telephone lines to -

a.) increase the transmission capacity

b.) improve noise performance

c.) incorporate error control coding

d.) eliminate dc component in the transmitted signal

68. The figure of a control system is shown. The maximum value of gain K for which the system is stable is- a.)

b.) 3

c.) 4

d.) 5

69. Identify the example of open-loop system-a.) A windscreen wiper b.) Aqualung

c.) Respiratory system of an animal

d.) A system for controlling Anti-rocket missiles.

70. Consider the following expressions indicating the step or impulse response of an initially relaxed control system-1. $(5 - 4e^{-2t}) u(t)$ 2. $(e^{-2t} + 5) (u(t))$

3. $(t) + 8e^{-2t} u(t)$

4. $(t) + 4e^{-2t} 4(t)$

Those which correspond to the step and impulse response of the same system include a.)

1&3

b.) 1&4

c.) 2&4

d.) 1&4

71. A system is described by

To test its stability by Lyapunov's method the following V functions are considered.

Mark the most suitable V -function in this case a.)

Only V_1

b.) Only V_2

c.) Both V_1 and V_2

d.) Neither V_1 nor V_2

72. Identify the polar plot of a typical type zero system with open loop transfer function

73. The scattering matrix of a magic –tee shown in the given figure is-

74. Which is the following relate to rational transfer function of a system-1. Ratio of Fourier transform of output to input with zero initial conditions.2. Ratio of Laplace transform of output to input with zero initial conditions.

3. Laplace transform of system impulse response.

4. Laplace transform of system unit step response select the correct answer using the codes given below.

Codes

a.) 1 and 4

b.) 2 and 3

c.) 1 and 3

d.) 2 and 4

75. For the signal $g(t) = 10 \cos(50\pi t) \cos^2(150\pi t)$ The Nyquist sampling rate in t seconds

is a.) 150 samples per second

b.) 200 samples per second

c.) 300 samples per second

d.) 350 samples per second

76. In the case of a 70 MHz 1F carrier for a transponder band width of 36 MHz; energy must lie between – MHz. a.) 34 and 106 b.) 52. And 88

c.) 106 and 142

d.) 34 and 142

77. Radar used to eliminate clutter in navigational application is – a.) Pulse radar b.) Tracking radar

c.) MTI radar

d.) Mono pulse radar

78. The 1.55 mm window is not yet in use with fiber optic systems because – a.) The attenuation is higher than at 0.85 mm b) The attenuation is higher than at 1.3mm
c.) Suitable laser devices have not yet been developed
d.) It does not lend itself to wavelength multiplexing

79. Pre-emphasis in FM systems involves – a.) Compression of the modulating signal b.)
Expansion of the modulating signal
c.) Amplification of lower frequency components of the modulating signal.
d.) Amplification of higher frequency components of the modulating signal.

80. In a terrestrial microwave system transmission of signals is achieved through – a.)
reflection from the ionosphere b.) line of sight mode
c) reflection from the ground
d.) diffraction from the stratosphere.

81. Casse grain feed is used with a parabolic reflector to a.) increase the gain of the system b.)
increase the bandwidth of the system
c.) reduce the size of the main reflector
d.) allow the feed to be placed at a convenient point.

82. In most microwave communication link rain drop attenuation is caused due to – a.)
scattering of microwaves by water drops of specific size. b) scattering of microwaves by a
collection of droplets acting as a single body.
c.) absorption of microwaves by water and consequent heating of the liquid
d.) absorption of the microwaves by water vapor in the atmosphere.

83. Circuit in the given figure represents. – a.) an astable
multivibrator
b.) A monostable multivibrator
c.) Voltage controlled oscillator

d.) Ramp generator

84. $\nabla \cdot \mathbf{D} = \rho$ is - a.) Maxwell's 1st equation b.) Maxwell's II equation

c.) Maxwell's III equation

d.) Maxwell's IV equation

85. In a rectangular wave-guide which TM mode exists - a.) TM₀₀ b.) TM₀₁

c.) TM₁₀

d.) TM₁₁

86. In directional coupler a portion of power two verry fram port 1) to port 2) is coupled to - a.) port 4 b.) port 3

c.) port 2.

d.) port 3 & 4.

87. For high power i.e. 10 w to 50 kw measurement -

a.) Barometer are used

b.) Thermisters are used

c.) Calorimetric technique

d.) Calorimetric watt meter technique used

88. The difference between TWT & klystron is -

a.) In TWT electrons are in contact with RF field for long time & in klystron for short time

b.) In klystron electrons are in contact with RF field for long time & in TWT for short time

c.) In klystron there is no contact in RF field & electrons while in TWT there is contact

d.) In TWT phase is no contact is RF field & electrons while in klystron there is contact

89. Which one is most suitable for transmission through wave guide a.)

Hown antennas

b.) Bioconical antennas

c.) helical antenna

d.) Disccone

90. The skip distance of microwave is given by –

a.)

b.)

c.)

d.)

91. How many general purpose registers 8085mpa.)

4

b.) 6

c.) 8

c.) 10

92. 8085 mP has no. of addressing modesa.)

2

b.) 3

c.) 4

d.) 5

93. What will be status of z and c y flag after execution of SUB A instruction

a.) $z = 0, cy = 0$

b.) $z = 0, cy = 1$

c.) $z = 1, cy = 0$

d.) $z = 1, cy = 1$

94. Microprocessor accept interrupt only if.

a.) interrupt flip flop disabled.

b.) when INTA signal is low.

c.) interrupt flip flop enabled.

d.) none of above.

95. Microprogramming is a technique

a.) for programming the microprocessor

b.) for writing small programs efficiently

c.) for programming the control steps of computer

d.) for programming o/p / i/p

96. High level programs like C are converted into machine language with the help of a.)

interpreter b.) compiler

c.) operating

d.) system

97. $(10110011)_2 = (?)_8$ a.) 253 b.) 263

c.) 273

d.) 283

98. A Not gate at the output of AND gate converts AND gate into- a.) NAND b.) NOR

c.) AND

d.) NOPE.

99. The O/P of a logic gate is the gate must be- a.) AND b.) OR

c.) NAND

d.) X-OR

100. A symbol of JK flip flop is-

101. A demultiplexer- a.) has multiple i/p and single o/p b.) has multiple i/p and

multiple o/p

c.) has multiple i/p and multiple o/p

d.) has single i/p and single o/p

102. . Which of the following best describes the authour`s attitude toward fairy tales

?a.) fascinationb.) open approval.

c.) Indulgent tolerance.

d.) Scornful.

103. What type of sentence is this ?Hurray! We won the matcha.) Exclamatory

b.) assertive

c.) Negative

d.) Affirmative

104. Before which of the following word will you put 'a'a.) hourb.) M. A.

c.) Umbrella

d.) Man

105. The noun form of 'fresh' is –a.) freshlyb.) freshen

c.) fresheners

d.) fresh itself

106. The word 'clang' is an example of –a.) Simileb.) inversion

c.) onomatopoeia

d.) irony

107. The Forbes magazine acclaimed Azim Premji as richest India's is the chairman

of-a.) Pentafour softwareb) Infosys

c.) IBM

d.) Wipro

108. Bharat Ratna award for the year 2001 goes to-a.) Lata Mangeshkar and Zakeer

Hussainb.) Zakeer Hussain and Bismillah Khan

c.) Bismillah Khan and Lata Mangeshkar

d.) Lata Mangeshkar and Ustad Amzad Ali Khan

109. Mr. George W-Bush takes over as — President of the united states of America succeeding Mr. Bill Clinton-a.) 42nd

b.) 43rd

c.) 40th

d.) 45th

110. New Chief Minister of Pondicherry is-a.) T. Venkat Naidub.) K. Hari Harh

c.) N. Rengaswany

d.) M. Mudliar

111. No court has the jurisdiction to interfere with the election process once set in motion by the Election commission. This is enshrined in Article-a.) 311b.) 329

c.) 356

d.) 365

112. Ostrich is a-a.) Running birdb.) Flying bird

c.) Swimming bird

d.) Migratory bird

113. The main atmospheric gas responsible for green house is-a.) Oxygenb.) Nitrogen

c.) Ozone

d.) Carbon-dioxide

114. Which of the following is not a Kharif Crop-a.) Riceb.) groundnut

c.) Sugarcane

d.) gram

115. The function of World Bank is to-a.) Help in reconstruction and development of world economyb.) Facilitate poor countries to trade on concessional rates

c.) Promote growth of international trade and equilibrium in balance of payments

d.) Ease trade barriers and establish rule of fair trade

116. Speed of sound is maximum in-a.) Waterb.) Air

c.) Steel

d.) Vacuum

117. "Long years ago we made a trust with destiny." Whose words are these-a.)

Subhash Chandra Boseb.) Jawaharlal Nehru

c.) Lajpat Rai

d.) Bhagat Singh

118. Durand cup is associated with-a.) Hockeyb.) Tennis

c.) Football

d.) Badminton

119. Rabindranath Tagore was awarded the Nobel Prize in literature in the year.a.)

1908b.) 1910

c.) 1913

d.) 1914

120. India successfully conducted its first underground nuclear experiment at Pokhran

in Rajasthan on-a.) May 18, 1975b.) May 20, 1974

c.) May 17, 1974

d.) May 17, 1974

121. An emergency loan of \$ 500 million to help reconstruct infrastructure in earthquake devastated Gujarat approved by-a.) Asian development Bankb.) World Bank

c.) Swiss Bank

d.) Reserve Bank of India