SCIENTIFIC ASSISTANT - PHYSICS

1. **In Born approximation, the effective cross section of scattering depends on -**
   1) Momentum P of the incident particle only
   2) The angel of scattering θ
   3) P and θ in any consideration
   4) P and θ only in combination P sin θ/2

2. **The Born approximation is applicable for -**
   1) High energy low atomic number for scatterer
   2) Low energy low atomic number for scatterer
   3) High energy high atomic number for scatterer
   4) Low energy high atomic number for scatterer

3. **Electrons have half integral spin and they obey -**
   1) B-E statistics
   2) M-B statistics
   3) F-D statistics
   4) Both F-D and M-B statistics

4. **For Pauli matrices, which one of the following relations is true ?**
   1) $\sigma_x \sigma_y = \sigma_y \sigma_x$
   2) $\sigma_x \sigma_y = \sigma_z$
   3) $\sigma_x \sigma_y = i\sigma_z$
   4) $\sigma_x \sigma_y = -i \sigma_x \sigma_y$

5.

In relativistic case, the magnetic moment of an electron is given by S =	
A.	$\frac{1}{2}\frac{\hbar}{m_0 c}$
B.	$\frac{1}{2}\frac{\sigma}{m_0 c}$
C.	$\frac{e\hbar\sigma}{2m_0 c}$
D.	$\frac{\hbar\sigma}{2m_0 c}$

6. **The width of the forbidden gap in the case of Dirac energy states is :**
   1) mc^2
   2) $2mc^2$
   3) 2 mc
   4) ½ mc^2

7. **The eigen values of all the four dirac matrices are -**
   1) +1
   2) -1
   3) ±1
   4) 0

8. **Klein and Gordon were not able to give a consistent explanation for the -**
   1) Kinetic energy
   2) Potential energy
   3) Negative energy
   4) Total energy

9.

The value of $[L_z, L_-]$ is:	
A.	$\hbar L_x$
B.	$\hbar L_y$
C.	$-\hbar L_-$
D.	$\hbar L_+$

10.

The value of $[L_y^2, L_x]$ is:	
A.	0
B.	$-2i\hbar L_z$
C.	$i\hbar[L_z L_y - L_y L_z]$
D.	$2i\hbar L_Z$

11. **Poisson brackets of all constant of motion with H must be -**
1) Maximum
2) Constant
3) Minimum
4) Zero

12.

The Jacobi's form of the least action principle is :	
A.	$\Delta \int \sqrt{2[L - V(q)]}\, dp = 0$
B.	$\Delta \int \sqrt{2[L + V(q)]}\, dp = 0$
C.	$\Delta \int \sqrt{2[H + V(q)]}\, dp = 0$
D.	$\Delta \int \sqrt{2[H - V(q)]}\, dp = 0$

13. **The solution to the Hamilton-Jacobi equation is called -**
1) Hamilton characteristic function
2) Hamilton's identity
3) Hamilton's principal function
4) Hamilton Jacobi identity

14. **When end atoms of a linear triatomic molecule vibrate in phase with equal amplitude and the central atom vibrates in opposite phase with a different amplitude the absorption band will appear in -**

1) Ultraviolet region
2) Infra red region
3) Visisble region
4) Red region

15. **In the case of linear triatomic molecule $w_1 = 0$ represents -**

1) Translatory motion
2) Rotatory motion
3) Vibratory motion
4) Both (A) and (B)

16.

The displacement of all atoms in a linear tri atomic molecule are equal and in the same direction if -	
A.	$\omega = 0$
B.	$\omega = \sqrt{\frac{k}{m}}$
C.	$\omega = \left\{\frac{k}{m}\left(\frac{1+2m}{M}\right)\right\}^{1/2}$
D.	$\omega = \left\{\frac{1+2m}{M}\right\}^{1/2}$

17. **The linear triatomic molecule has -**

1) One oscillatory and two tranlatory motions
2) One translatory and one oscillatory motions
3) One translatory and two oscillatory motions
4) Two oscillatory motions only

18. **In unstable equilibrium -**

1) The kinetic energy is maximum
2) The potentail energy is maximum
3) The potential energy is equal to total energy
4) Both (2) and (3)

19. **The total number of normal modes equal to -**

1) Number of frequencies
2) Number of amplitudes
3) Number of vibrations
4) Number of degrees of freedom

20. **Each coordinates executes only one single frequency of oscillation are termed as -**

1) Generalised co-ordinates
2) Normal co-ordinates
3) Cyclic co-ordinates
4) Cartesian co-ordinates

21.

In small oscillations the orthonormality condition is :	
A.	$\sum_{j,k} T_{jk}\, a_{ij}\, a_{rk} = 0$
B.	$\sum_{j,k} T_{jk}\, a_{ji}\, a_{kr} = 0$
C.	$\sum_{j,k} T_{jk}\, a_{ij}\, a_{ik} = 1$
D.	$\sum_{j,k} T_{jk}\, a_{ji}\, a_{kl} = 1$

22.

The Lagrangian interms of normal coordinates is L =	
A.	$\frac{1}{2}\sum_{r=1}^{n} \eta_r^2 - \frac{1}{2}\sum_{r=1}^{n} w_r^2 \eta_r^2$
B.	$\frac{1}{2}\sum_{r=1}^{n} \dot{\eta}_r^2 - \frac{1}{2}\sum_{r=1}^{n} w_r^2 \eta_r^2$
C.	$\frac{1}{2}\sum_{r=1}^{n} \eta_r^2 - \frac{1}{2}\sum_{r=1}^{n} w_r^2 \dot{\eta}_r^2$
D.	$\frac{1}{2}\sum_{r=1}^{n} \dot{\eta}_r^2 - \frac{1}{2}\sum_{r=1}^{n} w_r^2 \dot{\eta}_r^2$

23.

$\sum_i P_i \dot{Q}_i - H$ =	
A.	L
B.	$\frac{ds}{dt}$
C.	$\frac{dH}{dt}$
D.	Both (A) and (B)

24.

If $w = w(q_j, \alpha_j)$, then $\frac{\partial \omega}{\partial q_j} =$	
A.	p_j
B.	$\dot{p}_j$
C.	q_j
D.	$\dot{q}_j$

25.

From Hamilton's principal function :	
A.	$\frac{\partial S}{\partial t} = \sum_j p_j \dot{q}_j - L$
B.	$\frac{\partial S}{\partial t} = \sum_j \dot{p}_j q_j - L$
C.	$\frac{\partial S}{\partial t} = \sum_j p_j q_j - H$
D.	$\frac{\partial S}{\partial t} = \sum_j p_j \dot{q}_j - H$

26.

In Kepler's problem the energy for elliptical path is E =	
A.	$\frac{Ze^2}{2a}$
B.	$\frac{-Ze^2}{2a}$
C.	$\frac{Ze^2}{a}$
D.	$\frac{-Ze^2}{8\pi a}$

27.

The Kepler's III law can be represented as T =	
A.	$\frac{2\pi}{\sqrt{(GM)}} a^{3/2}$
B.	$\frac{4\pi}{\sqrt{(GM)}} a^{3/2}$
C.	$\frac{\sqrt{(GM)}}{2\pi} a^{3/2}$
D.	$\frac{2\pi}{GM} a^{3/2}$

28.

In the expression $E = -\frac{2\pi m z^2 e^4}{n^2 h^2}$, n is known as	
A.	Orbital quantum number
B.	Magnetic quantum number
C.	Principal quantum number
D.	Spin quantum number

29.

In $W_i=\frac{\partial W}{\partial J_i}(q,J)$, the quantity w represents -	
A.	Action variable
B.	Angle variable
C.	Action angle variable
D.	Canonical variable

30.

In the eccentricity of kepler's problem $e=\sqrt{1+\frac{2EI^2}{mk^2}}$ $e>1, E>0$ represents -	
A.	Circle
B.	Ellipse
C.	Parabola
D.	Hyperbola

31. **All ellipses with the some major axis have -**
1) The same energy
2) Constant energy
3) Minimum energy
4) Different energy

32. **In the case of elliptic orbits, energy is proportional to -**
1) a
2) a^{-1}
3) a^{-3}
4) a^3

33. **The product of inertia co-efficient is :**
1) I_{xx}
2) I_{yy}
3) I_{zz}
4) I_{xy}

34. **To generate Euler's angle the number of successive rotations required is :**
1) 1
2) 2
3) 3
4) 4

35. **In a degenerate motion to describe the periodic motion of the system. The number of frequencies required is :**
1) zero
2) Indeterminate
3) Less
4) More

36.

If the rigid body is considered as rigid collection of particles, its angular momentum is:	
A.	$\sum_i m_i[(w x \bar{r}_i)]$
B.	$\sum_i m_i[\bar{r}_i x(w x \bar{r}_i)]$
C.	$\sum_i \bar{r}_i x(w x \bar{r}_i)$
D.	$\sum_i \bar{r}_i x(w+\bar{r}_i)$

37.

The rotational kinetic energy of a rigid body is given by -	
A.	$\frac{1}{2m} W \vec{L}$
B.	$\frac{1}{2} \bar{r} x \bar{p}$
C.	$\frac{1}{2m} W \vec{L}$
D.	$\frac{m\vartheta^2}{r}$

38. A quantity closely related to the moment of sinstia :

1) mass
2) length
3) radius
4) radius of gyration

39. The coriolis force is:

1) position dependent
2) velocity dependent
3) displacement dependent
4) Rotation dependent

40.

In Euler's angles $\begin{pmatrix} \cos\phi & \sin\phi & 0 \\ -\sin\phi & \cos\phi & 0 \\ 0 & 0 & 1 \end{pmatrix}$, The rotation is about -	
A.	θ
B.	ψ
C.	γ
D.	ϕ

41. N particles moving in a configuration space is called -

1) particte flow
2) system point
3) configuration point
4) particles Transit

42.

In the motion of a Symmetric top, Lagrangian is:	
A.	$\frac{I_1}{2}(\theta'^2+\phi'^2)+\frac{I_3}{2}(\psi+\varphi'\cos\theta)^2-mgl\cos\theta$
B.	$\frac{I_2}{2}(\theta'^2+\phi'^2\sin^2\theta)+\frac{I_3}{2}(\psi+\varphi'\cos\theta)^2-mgl\cos\theta$
C.	$I_1(\theta'^2+\phi'^2)+I_3(\psi+\varphi'\cos\theta)^2-mgl\sin\theta$
D.	$I_2(\theta'^2+\phi'^2\sin^2\theta)+I_3(\psi+\varphi'\cos\theta)^2-mgl\cos\theta$

43. For a 6-bit ladder DAC(0=0V, 1=10V) which has input of 101001, the output value is :

1) 4.23 V
2) 5.52 V
3) 6.41 V
4) 9.23 V

44.

The minimum spin angular velocity below which the top cannot spin stably about the vertical axis is given by –	
A.	$\left\lvert\frac{4mgI_1^2}{I_3}\right\rvert^{1/2}$
B.	$\left\lvert\frac{4mgI_1}{I_1^2}\right\rvert^{1/2}$
C.	$\left\lvert\frac{2mgI_1^2}{I_2}\right\rvert^{1/2}$
D.	$\left\lvert\frac{3mgI_1}{I_1^2}\right\rvert^{1/2}$

45. When fast top released from rest, it precesses slowly and rotates simple harmonically with -

1) Large frequency and small amplitude
2) small frequency and large amplitude
3) Small freqency and small amplitude
4) Large frequency and large amplitude

46.

When the top attains nutation of the symmetry axis, it precesses with a constant angular velocity given by θ' -	
A.	$\left\lvert\frac{a-b\sin\theta_0}{\cos^2\theta_0}\right\rvert$
B.	$\left\lvert\frac{a-b\cos\theta_0}{\sin^2\theta_0}\right\rvert$
C.	$\left\lvert\frac{b-a\sin\theta_0}{\cos^2\theta_0}\right\rvert$
D.	$\left\lvert\frac{b-a\cos\theta_0}{\sin^2\theta_0}\right\rvert$

47. **The rotation about Z-axis corresponds to angle Φ in the case of symmetrical top is called -**

1) precession
2) Nutation
3) Spin
4) Rotation

48.

The expression for the larmor frequency is ω_L =	
A.	$\frac{eB}{2mc}$
B.	$\frac{-eB}{2mc}$
C.	$\frac{em}{2Bc}$
D.	$\frac{em}{2Be}$

49.

The system is said to be in equilibrium when $\left(\frac{\delta y}{\delta q_i}\right)_0$ =	
A.	1
B.	extremum
C.	0
D.	Constant

50.

In the case of top the formula used to find the period of precession of the axis of rotation about the symmetry axis is :	
A.	$\frac{2\pi I_3}{I_3 - I_1}$
B.	$\frac{4\pi I_1}{I_3 - I_1}$
C.	$\frac{2\pi}{\omega_2}\cdot\frac{I_1}{I_3 - I_1}$
D.	$\frac{4\pi}{\omega_2}\cdot\frac{I_3}{I_3 - I_1}$

51. **Raman Scattering is:**

1) elastic scattering
2) Inelastic scattering
3) both elastic and inelastic scattering
4) similar to Rayleigh scattering

52. **In Raman scattering frequency shift are determined by -**
1) Scatterer
2) Source and Scatterer
3) Optical Source
4) None of the above

53. **Commonly used unit of frequency in vibrational spectroscopy is :**
1) Hertz
2) m^{-1}
3) cm^{-1}
4) cm

54.

A diatomic molecule executes harmonic oscillation it's vibrational spectra are equally spaced. The energy of the lowest state is : (ν_0 - fundamental frequency)	
A.	ν_0
B.	$\frac{1}{2}\nu_0$
C.	$\frac{1}{2}\frac{\nu_0}{c}$
D.	$\frac{2\nu_0}{c}$

55. **The vibrational energy of a molecule at the lowest vibrational level is:**
1) Zero
2) Infinite
3) Indeterminant
4) Not Zero

56. **In Infra red spectroscopy, the potential energy function is called as**
1) Morse function
2) Square well function
3) Moses fuction
4) Dissociation energy function

57. **The weak absorption bands on the low frequency side of the vibration spectra is reffered as.**
1) Cold bonds
2) Morse bands
3) Hot bands
4) Overtones

58. **The range of the middle infrared region is**
1) .75μm to 1.4μm
2) 3μm to 8μm
3) 8μm to 1000μm
4) 1.4mm to 8 mm

59. **The number of polarized Raman lines of linear symmetric triatomic molecule is**
1) 2
2) 1
3) 3
4) 0

60. **The number of polarized Raman lines of planar XY_3 molecule is**
1) 1
2) 7
3) 4
4) 2

61. **The number of polarized Raman lines of linear asymmetric triatomic molecule is -**
1) 2
2) 1
3) 3
4) 0

62. **Which one of the following gives magnetic moment to nucleus?**
1) Orbital angular momentum
2) nuclear angular momentum
3) intrinsic spin angular momentum
4) mass of the nucleus

63.

The nuclear spin of $^{15}_{7}N$ is	
A.	1
B.	zero
C.	½
D.	2

64.

The nuclear spin of $^{16}_{8}O$ is :	
A.	1
B.	zero
C.	½
D.	2

65. **The value of nuclear magneton is**

1) 5.051×10^{-27} Nm²
2) 5.051×10^{27} Nm²
3) 5.051×10^{-24} Nm²
4) 50.51×10^{-27} Nm²

66. **Typical external magnetic field used in NMR experiments are in the range (NMR - Nuclear Magnetic Resonance)**

1) 1 to 10 T
2) .1 to .5 T
3) 1 to 5T
4) 1 to 100T

67. **The NMR of a proton nuclear is often called as (NMR - Nuclear Magnetic Resonance)**

1) PNMR
2) MRI
3) Proton Magnetic Resonance
4) Proton Nuclear Magnetic Resonance

68. **The frequency associated with precession of a magnetic dipole about the direction of a applied magnetic field referred 'as**

1) Bhor frequency
2) Larmor frequency
3) Gyromagnetic frequency
4) Morse frequency

69. **The ESR technique contined to the study of those species having one or more -**

1) Paired electrons
2) π-electrons
3) unpaired electrons
4) Protons

70. **Electron spin resonance also called as -**
1) Electron magnetic resonance
2) Nuclear magnetic resonance
3) Electron paramagnetic resonance
4) Electron quadrapole moment

71. **The spectrometers operating around 9.5 GHZ frequency are referred as -**
1) X-band spectrometer
2) Q-band spectrometer
3) Magnetic spectrometer
4) Electron spin spectrometer

72. **The spectrometer operating around 35GHZ frequency are referred as -**
1) X-band spectrometer
2) Q-band spectrometer
3) Magnetic spectrometer
4) Electron spin spectrometer

73. **The usual source of radiation for ESR spectrometer is :**
1) Coolidge tube
2) Magnetron oscillator
3) Klystron oscillator
4) He-Ne Laser

74. **The Nuclear Quadrupole resonance frequencies range is :**
1) 1000 KHZ - 10,000 MHZ
2) 100 KHZ - 1000 MHZ
3) 1000 MHZ - 2000 MHZ
4) 100GHZ - 1000 GHZ

75. **The expression for the nuclear quadrupole coupling constant is :**
1) eq Q/h
2) eq^2Q/h
3) e^2q Q/h
4) eq Q/h^2

76. **The method used for the detection of NQR frequencies is (NQR-Nuclear Quadrupole Resonance)**
1) Klystron oscillator method
2) Magnetron Method
3) Regenerative pulsed wave oscillator method
4) Regenerative continuous wave oscillator method

77. **The number of allowed transition between energy levels for a nuclear having spin I=5/2 is**
1) 1
2) 3
3) 4
4) 2

78. **The study of gamma ray absorption spectra for transistion between nuclear state is called as**
1) NMR Spectroscopy
2) NQR Spectrocopy
3) Gammaray Spectroscopy
4) Mossbaver Spectroscopy

79. **The chemical shift also called as -**
1) Isotope shift
2) Gamma shift
3) Isomer shift
4) Doppler shift

80. **The Spin value of the Mossbauer nuclear levels is**
1) Greater than 1/2
2) Less than 1/2
3) 1/2
4) 1

81. The Momentum P of a body having kinetic energy T and rest mass Mo -

A.	$\sqrt{\frac{T^2}{C^2} + 2m_oT}$
B.	$\sqrt{\frac{T^2}{2m_oT} + C^2}$
C.	$\sqrt{\frac{T^2}{2C^2} + 2m_oT}$
D.	$\left(\frac{T^2}{C^2} \cdot 2m_oT\right)^{1/3}$

82. **The postulates of special theory of relativity are applicable to -**
1) Stationary frame
2) Inertial frame
3) Accelerated frame
4) None of these

83. **Of the two twin brothers, One goes on a relativistic tour and comes back. The brother on tour will**
1) become younger
2) become old
3) be the same age
4) be double the age of another

84. **Two photons recede from each other. Their relative velocity will be (C - velocity of light**
1) 2C
2) C
3) $C^2/2$
4) infinite

85. **Two photons approach each other. Their relative velocoty will be (C-Velocity of light)**
1) Zero
2) Less than C
3) More than C
4) 2C

86. **The reference frame attached to the earth is -**
1) An inertial frame
2) A non-accelerated frame
3) A velocity frame
4) An accelerated frame

87. **Units of gravitational constant G are**
1) $N\text{-}m\text{-}kg^2$
2) $N^2\text{-}m\text{-}kg$
3) $N\text{-}m^2\text{-}kg$
4) $N\text{-}m^2\text{-}kg^{-2}$

88. **Height of a geostationary satellite is (g=9.8m/sec; T= 86400sec; R = $6400x10^3$m**
1) 35950km
2) 86400km
3) 35950m
4) 36950km

89. The expression for determining the height of geostationary satellite from the surface of earth -

A.	$h = \left\{\frac{gR^2T^2}{4\pi^2}\right\}$
B.	$h = \left\{\frac{g^2RT^2}{4\pi^2}\right\} - R$
C.	$h = \left\{\frac{gR^2T^2}{4\pi^2}\right\} - R$
D.	$h = \left\{\frac{g\pi^2R^2}{4T^2}\right\} - R$

(g = acceleration due to gravity; R = radius of the earth T = Time period)

90. **In India, the first scientific satelite launched in the year**
1) 1957 2) 1975
3) 1967 4) 1981

91. **India's first geostationary satelite**
1) Apple 2) Sputhik
3) Telstar 4) Aryabhata

92. **India's first scientific satelite**
1) Apple 2) Aryabhata
3) Rohini 4) Skylab

93. **The skylab launched in the year -**
1) 1971 2) 1979
3) 1973 4) 1967

94. **The artifical satellite sputhik I launched in the year**
1) 1947 2) 1957
3) 1967 4) 1857

95. **The radius of the synchronous orbit from the centre of the earth is -**
1) 35,799 km 2) 52,170 km
3) 42,170 km 4) 6400 km

96. **Minor celestial body revolving round any one of the major celestial bodies is called as -**
1) Meteors 2) Binaries
3) Satellite 4) stars

97.

The force acting due to gravitational attraction on a body placed at a distance x from the centre of the earth is equal to -	
A.	$\frac{GmM}{x}$
B.	$\frac{GMm}{x^2}$
C.	$\frac{mM}{x}$
D.	$\frac{mM}{x^2}$

(G = Gravitational constant; M = Mass of the earth m = mass of a body - distance)

98. **Escape velocity in space is -**

1) The minimum velocity necessary for a body to free itself from gravitational pull
2) Maximum velocity for the same
3) The velocity with which the rocket leaves the ground
4) The velocity with which the rocket moves in space

99. **The escape velocity from the surface of moon is -**

1) Greater than the escape velocity from the surface of earth
2) Less than the escape velocity from the surface of the earth
3) equal to the escape velocity from the surface of the earth
4) zero

100. **The earth's first artificial satellite was -**

1) sputhik I
2) Apollo
3) Aryabhata
4) Explorer I

101.

Which of the following relations is not valid at relativistic speed?	
A.	$\bar{P} = m\bar{v}$
B.	$\bar{F} = m\bar{a}$
C.	$\bar{F} = \frac{d\bar{P}}{dt}$
D.	$\Delta\bar{P} = \bar{F}t$

102. **The time period of a geostationary satellite is :**

1) 12 hrs
2) 24 hrs
3) 8 hrs
4) 11.2 hrs

103.

If a satellite is launched into a circular orbit close to the earth, its velocity is	
A.	$2gR$
B.	gR
C.	$\sqrt{gR}$
D.	$\sqrt{2gR}$

(: g-acceleration due to gravity R- radius of the earth)

104. The orbit of an artificial satellite is :

1) Elliptic
2) Hyperbolic
3) Circular
4) Parabolic

105. The value of escape velocity of a body from the earth :

1) 11.2 m/sec
2) 11.2 km/hr
3) 1.12 km/sec
4) 11.2 km/sec

106. The value of the radius of the earth is :

1) 6.4×10^{66}m
2) 64×10^{6}m
3) 6.4×10^{6}m
4) 6.6×10^{8}m

107. A satellite which revolves round the earth at a suitable height with the same velocity and in the same direction is called as -

1) Natural satellite
2) Stationary satellite
3) Geostationary satellite
4) Artificial satellite

108.

The relative velocity of a geostationary satellite with respect to earth is :	
A.	Infinite
B.	$1-\frac{\vartheta^2}{c^2}$
C.	Half the velocity of the earth
D.	Zero

109. A body hurled into space with the help of powerful rocket so that it begins circling round the earth is known as -

1) Satellite
2) Natural satellite
3) Artificial satellite
4) Celestial body

110. Traces Dirac matrices are -

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

111.

The escape velocity for a body on the moon is :	
A.	$V_0 = \sqrt{\frac{GM}{r}}$
B.	$V_0 = \sqrt{\frac{2GM}{r}}$
C.	$V_0 = \sqrt{\frac{2GM}{r^2}}$
D.	$V_0 = \sqrt{2Gr}$

(r –radius of the moon : G- gravitational constant : M- Man of the moon)

112. A satellite orbiting at 35,880 km above the earth. The time taken for one revolution around the earth is :

1) 15 hrs
2) 20 hrs
3) 12 hrs
4) 24 hrs

113. Geophone converts seismic oscillations of the earth into -

1) Electrical vibrations
2) Mechanical vibrations
3) Electronic pulses
4) Sound waves

114. A suddenslip between two rock masses of the earth seperated by a crack due to earthquake is called as -

1) Dip
2) Fault
3) Seismic fracture
4) Walking rock

115. The point on the earth's surface vertically above the focus of the earth quake is called -

1) Energy point
2) Point of explosion
3) Epicentre
4) Seismic point

116. For the buildings would be safe at the time of earth quake, they should be constructed so as to with stand a horizontal earth acceleration of -

1) 0.5 g to 0.6 g
2) 1 g to 2 g
3) 0.8 g to 0.9 g
4) 0.1 g to 0.2 g

117. Trasverse waves propagated in the earth referred as -

1) T-waves
2) S-waves
3) N-waves
4) Normal waves

118. Primary and secondary waves propagated through the earth is referred as -

1) Penetrating waves
2) Transmitted waves
3) Body waves
4) Chest waves

119. In earth, the region between the core and the crust referred as -

1) Trough
2) Fault
3) Dip
4) Mantle

120. Recording the quakes of the earth at any place is called as -

1) Rayleigh graph
2) Seismo graph
3) Geo graph
4) Mantle graph

121. A D/A converter has 5 V full scale output voltage and an accuracy of ± 0.2 %. The maximum error for any output voltage will be -

1) 5 mV
2) 10 mV
3) 20 mV
4) None of these

122. For a 12 bit ADC the range of input signal is 0 V to +10 V the voltage corresponding is ILSB will be -

1) 0 V
2) 0.0012 V
3) 0.0024 V
4) 0.833 V

123. A multiplexer is also known as -

1) Counter
2) Decode
3) Data selector
4) None of these

124. After executing the instruction MVIB, OOH the flag affected is :

1) CY
2) AC
3) Z
4) None

125. To decode 2 k x 8 memory, the number of addressing lines required is :

1) 8
2) 10
3) 11
4) 12

126. Select the instruction which does not have an execution cycle -

1) RSTO
2) MOV A,A
3) HLT
4) NOP

127. Select the flag which is not accessible to the user directly -

1) Z
2) CY
3) AC
4) S

128. Select the non-maskable interrupt available is 8085 CPU ?

1) RST 4.5
2) RST 5.5
3) RST 6.5
4) RST 7.5

129. On execution of the instruction XCHG, the flag affected is -

1) Z
2) CY
3) AC
4) None

130. An 8 bit microprocessor signifies that it has -

1) An 8-bit address bus
2) An 8-bit control bus
3) 8 interrupt lines
4) An 8 bit data bus

131. The data size of 8085 microprocessor is :

1) 8 bit
2) 16 bit
3) 32 bit
4) 5 bit

132. The 8085 system bus is made up of -

1) Data bus
2) Data bus and address bus
3) Data bus and control bus
4) Data bus, control bus and address bus

133. In the program given below, MVI B, 64 Loop :DCR B JNZ, loop The number of times the instruction DCRB is executed is :

1) 100
2) 99
3) 64
4) 63

134. The number of address lines required if a microprocessor has to access 1k byte of memory is :

1) 10
2) 100
3) 1000
4) 99

135. In a PPI 8255, if the address for the control word register is DB, the addresses for the PORT A, PORT B and PORT C are -

1) D8, D9, DA
2) DC, DD, DE
3) DA, D9, D8
4) D1, D2, D3

136. The CMP instruction modifies the -

1) Program counter
2) Instruction register
3) Flags register
4) Segment register

137. The stack pointer stores -

1) The address of the stack in memory
2) Address of the last item pushed on the stack
3) The address of the next free stack location
4) The address of the last item popped from the steak

138. Given that accumulator contains FOH, the effect of the following ORI, OFH is :

1) Clear accumulator
2) Store FFH in accumulator
3) Store OFH in accumulator
4) Leaves accumulator unchanged

139. A machine cycle refers to -

1) Fetching an instruction
2) Clock speed
3) Fetching, decoding and executing an instruction
4) Executing an instruction

140. The address /data bus in 8085 microprocessor is :

1) Multiplexed
2) Demultiplexed
3) Decoded
4) Loaded

141. The stack pointer holds -

1) 16 bit address
2) 16 bit data
3) 8 bit address
4) 8 bit data

142. In 8085 microprocessor _____ is called as high order register.

1) Accumulator
2) Flag
3) H register
4) Program counter

143. Data that are stored at a given address in a random access memory (RAM) is lost when -

1) Power goes off
2) The data are read from the address
3) Data are refreshed at the address
4) The memory is full

144. Data are stored in a RAM during the -

1) Read operation
2) Enable operation
3) Write operation
4) Addressing operation

145. Read Only Memory (ROM) -

1) Is faster to access than RAM
2) Is non volatile
3) Stores more information than RAM
4) Is used for cache memory

146. When the power supply of a ROM is switched off, its contents -

1) Become all zeroes
2) Become all ones
3) Remain intact
4) Are unpredictable

147. Cache memory enhances -

1) Memory capacity
2) Memory access time
3) Secondary storage capacity
4) Secondary storage access time

148. Cache memory -

1) Has greater capacity than RAM
2) Is faster to access than CPU register
3) Is permanent storage
4) Faster to access than DRAM

149.

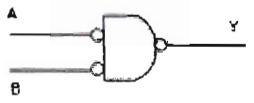
Match List I with List II and select the correct answer using the codes given below the lists .

List I	List II
I) NOR	a) $\overline{A}.\overline{B}$
II) NAND	b) $A\overline{B} + \overline{A}B$
III) XOR	c) $AB + \overline{A}\overline{B}$
IV) XNOR	d) $\overline{A+B}$

	I	II	III	IV
A.	b	c	d	a
B.	d	a	b	c
C.	b	a	d	c
D.	d	c	b	a

150.

For the gate shown in figure, the output will be LOW :



A.	If one of the inputs is HIGH
B.	If both the inputs are HIGH
C.	If one of the inputs is LOW
D.	If and only if both the inputs are LOW

151. Which of the following gates is known as an universal gate?

1) AND
2) NAND
3) NOT
4) OR

152. The dual of the boolean theorem A.(B+C)=A.B+A.C is

1) A+(B.C)=(A.B)+(A.C)
2) A.(B+C)=(A+B).(A+C)
3) A+(B.C)=(A+B).(A+C)
4) None of the above

153. Two's complement of the twos compliment of the binary number 01101100 is

1) 1001 0100
2) 0110 1100
3) 1001 0011
4) 1110 1100

154.

The minimized expression for the K-map is

CD \ AB	00	01	11	10
00	0	1	0	0
01	0	1	0	0
10	0	1	0	X
11	0	1	X	X

A.	$\bar{A}(A+B)$
B.	$\bar{A}+B$
C.	$\bar{A}B$
D.	$(\bar{A}+\bar{B})(\bar{A}+B)(A+B)$

155. Demultiplexer is also known as

1) Data selector
2) Data distributor
3) Multiplexer
4) Encoder

156. What is the largest number of data inputs which a data selector with two control inputs can have-

1) Two
2) Four
3) Eight
4) Sixteen

157. According to the commutative law of addition-

1) AB=BA
2) A=A+A
3) A+(B+C)=(A+B)+C
4) A+B=B+A

158.

The Boolean expression $B(A+B)+A(\overline{B}+A)$ Can be realized using minimum number of	
A.	1 AND gate
B.	2 AND gate
C.	1 OR gate
D.	2 OR gate

159. In positive logic,a '1' represents-

1) an ON Circuit
2) A CLOSED switch
3) a HIGH voltage
4) all the above

160.

The logic expression $Y=\varepsilon_m(0,3,6,7,10,12,15)$ is equivalent to	
A	$Y=\overline{\wedge}_m(0,3,6,7,10,12,15)$
B	$Y=\overline{\wedge}_m(1,2,4,5,8,9,11,13,14)$
C	$Y=\varepsilon_m(1,2,4,5,8,9,11,13,14)$
D	$Y=\varepsilon_m(0,3,10,12)$

161. In amplitude modulation the upper side band frequency is 105 MHz and the lower side band frequency is 95 MHz. What is the frequency of the carrier wave?

1) 50MHz
2) 100MHz
3) 150MHz
4) 200MHz

162. Identify the correct order in which they appear in FET characteristics-

1) Ohmic region, pinchoff region,avalanche region.
2) Pinchoff region, Ohmic region, Avalanche region.
3) Avalanche region, Pinchoff region, Ohmic region.
4) Ohmic region, Avalanche region, Pinch off region.

163. Identify the correct order in which they appeared in the transistor characteristics-

1) Cut-off region, Saturation region, Active region
2) Saturation region, Active region, Cut-off region.
3) Active region, Cut-off region, Saturation region.
4) Active region, Saturation region,Cut-off region.

164. In RADAR system, the Duplexer is also called as

1) Transmitter switch
2) Reciever switch
3) T-R switch
4) Modulator

165. Consider the following statements: Assertion[A]: The radar reciever can detect signals of very small power. Reason[R]: It has sensitive short wave superheterodyne reciever. Now select the answer according to the coding scheme given below:

1) Both A and R are true R is the correct explaination of A
2) Both A and R are true but R is not the correct explaination of A
3) A is true but R is false
4) A is false and R is true

166. The transmitter in the RADAR consists of high power-

1) Cyclotron
2) Synchrotron
3) Synchrocyclotron
4) Magnetron

167. The variation of signal strength with time in the sky-wave propagation is called

1) Propagating
2) Vanishing
3) Fading
4) Oscillating

168. For minimizing the fading of radio waves in the skywave propagation, which of the following is used in radio recieves

1) Automatic volume control
2) Automatic signal control
3) Automatic noise control
4) Automatic tuner control

169. If the electron density of the imospheric layer is $9x10^{14}$ electrons/cm^3, calculate the critical frequency-

1) 27 MHz
2) 81MHz
3) 270GHz
4) 270MHz

170. Consider the following statements: Assertion[A]: The upper part of the atmosphere at about 50 to 350 Km above the earth's surface is called ionosphere. Reason[R]: This part of the atmosphere continually absorb large quantites of radiant energy from the sun and consequently gets ionized. Now select the answer according to the coding scheme given below:

1) Both A and R are true R is the correct explaination of A
2) Both A and R are true but R is not the correct explaination of A
3) A is true but R is false
4) A is false and R is true

171. The ionosphere behaves like a medium having refractive index, n equal to

A.	$\sqrt{\left(1-\frac{81N}{f^2}\right)}$
B.	$1-\frac{81N}{f^2}$
C.	$\frac{81N}{f^2}$
D.	$\frac{N}{f^2}$

172. An inospheric layer won't return a sky wave if the frequency of transmission

1) Is less than maximum usable frequency
2) Is more than maximum usable frequency
3) Is less than threshold frequency
4) Is more than threshold frequency

173. In radio transmisssion, the space wave has components namely

1) Short wave and long wave
2) Ground wave and sky wave
3) Direct wave and indirect wave
4) Direct wave and earth reflected wave

174. Transmission of the radio wave in the ultrahigh frequency band occurs solely by-

1) Ground Wave
2) Direct Wave
3) Earth reflected wave
4) Sky wave

175. The F.M and T.V programmes in the very high frequency band are transmitted-

1) Solely by direct wave
2) Solely by earth reflected wave
3) Both by direct and earth reflected wave
4) None of the above direct and earth reflected waves.

176. The centre of frequency of an F.M carrier is 105MHz. The highest frequency of the modulating signal is 105.04 MHz, when modulated by a signal of 8 KHz. Find the modulation index.

1) .2
2) 5
3) 48
4) 32

177. The multivibrator used as memory elements in shift register and counters is

1) Astable multivibrator
2) Monostable multivibrator
3) Bistable multivibrator
4) Schmitt trigger

178. Which one of the following can be used as voltage comparator.

1) Astable multivibrator
2) Monostable multivibrator
3) Bistable multivibrator
4) Schmitt trigger

179. The difference between upper trigger point and lower trigger point in schmitt trigger is called

1) Critical Voltage
2) Threshold Voltage
3) Hysterisis voltage
4) Band width

180. The range of radio wave frequency in the EM spectrum

1) 1 Hz to 10 KHz
2) 10KHz to 300GHZ
3) 300GHz to 500GHz
4) 500GHz o 1000GHz

181. Consider the statement RADAR is I Used to detect enemy aircraft. II Used to mapping of thunderstroms and other meterological disturbences. III Used to measure distance and study the characteristics of moon IV Used to detect submarines Of the statements

1) I, II and III alone are true
2) I, II and IV alone are true
3) I alone correct
4) All are correct

182. Calculate the distance between the target and receiver if the time taken by the waves to travel to the target and back to the reciever is 0.02S, in RADAR system.

1) 3000m
2) 3000Km
3) 6000m
4) 6000Km

183. If in a transistor I_B=.2mA and I_E=2mA, calculate Ic.

1) .9mA
2) 1.1mA
3) 1.8mA
4) 2.2mA

184. In a common emitter configuration of a transistor β=7 and I_B=.5mA. Calculate I_C

1) 2.5mA
2) 3.5mA
3) 6.5mA
4) 7.5mA

185. Calculate the power of an amplifier if R_L=10KΩ and I_C=.2A.

1) 2 watt
2) 400 watt
3) 200 watt
4) 1000 watt

186. If A is the open loop gain and β is the feedback factor, then the Barkhausen condition is

1) A=β
2) A=1/β
3) A<1/β
4) A>1/β

187. In an oscillator circuit the total phase around the closed loop should be

1) 90^O
2) 180^O
3) 270^O
4) 0^O or 360^O

188. If the modulation index in A.M is 0.4 and the peak voltage of carrier wave is 50V. What is the peak voltage of the signal.

1) 20V
2) 50.4V
3) 49.6V
4) 125V

189. In an inverting amplifier R_f=10KΩ and R_1=2KΩ. Calculate the closed loop voltage gain,A_c.

1) -0.2
2) -4
3) -5
4) -6

190. In an non-inverting amplifier R_f is 200KΩ and R_1 is 50KΩ. What is the gain?

1) 1.25
2) 5
3) 76
4) 126

191. Calculate V_1 if in a subtractor circuit of an op-amp has V_0=6V and V_2=12V.

1) 3V
2) 18V
3) 6V
4) 24V

192. Which one of the following is used in variable audio frquency generator-

1) Hartley Oscillator
2) Colpitt's Oscillator
3) Phase shift oscillator
4) Wein bridge Oscillator

193. **To have sustained oscillations in phase-shift oscillator, the minimum value of the forward current gain ratio of the transistor should be**

1) 26 2) 36
3) 46 4) 56

194. **Consider the following statements: Assertion[A]: The phase shift oscillator has less distortion. Reason[R]: It is operated in class A condition. Now select the answer according to the coding scheme given below.**

1) Both A and R are true R is the correct explaination of A
2) Both A and R are true but R is not the correct explanation of A
3) A is true but R is false
4) A is false and R is true

195. **The first and second stage in a wein bridge oscillator has-**

1) CE and CC amplifiers respectively
2) CC and CE amplifiers respectively
3) CE and CB amplifiers respectively
4) Two FET amplifiers in respective stages

196. **In a FET amplifier the change in drain current is .2 mA and drain resistance is 10KΩ . What is the drain to source voltage?**

1) 2mV 2) 2V
3) 20KV 4) 5V

197. **In the T.V receiving system, the output from the video amplifier is applied to the control grid of the**

1) Rf amplifier 2) Loud speaker
3) Sweep generator 4) Kinetoscope

198. **In the T.V receiving system any inference riding on the top of signals in the form of amplitude modulation is removed by-**

1) FM detector 2) Limiter
3) Mixer 4) Synchronizing pulse separator.

199. **The class C amplifier has output current for a full input a.c signal. Select the correct output signal.**

1) Full cycle 2) Half cycle
3) More than half cycle 4) Less than half cycle

200. **In class AB amplifier the output signals exist for an input a.c signal.**

1) Upto 180^0 2) more than 180^0
3) more than 180^0 less than 360^0 4) Less than 180^0