

**DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO**

**TEST BOOKLET SERIES**

**TEST BOOKLET**  
**PGT(PHYSICS)-2016**



Time Allowed : 2 Hours)

(Maximum Marks : 100

*All questions carry equal marks.*

**INSTRUCTIONS**

1. Immediately after the commencement of the examination, you should check that test booklet does not have any unprinted or torn or missing pages or items, etc. If so, get it replaced by a complete test booklet.
2. **Encode clearly the test booklet series A, B, C or D as the case may be in the appropriate place in the answer-sheet.**
3. Write your Roll Number only in the box provided alongside.   
Do not write anything else on the Test Booklet.
4. This Test Booklet contains 100 items (questions). Each item comprises four responses (answers). Choose only one response for each item which you consider the best.
5. After the candidate has read each item in the Test Booklet and decided which of the given responses is correct or the best, he has to mark the circle containing the letter of the selected response by blackening it completely with Black or Blue ball pen. In the following example, response "C" is so marked :  

(A)   (B)   ●   (D)
6. Do the encoding carefully as given in the illustrations. While encoding your particulars or marking the answers on answer sheet, you should blacken the circle corresponding to the choice in full and no part of the circle should be left unfilled. After the response has been marked in the ANSWER SHEET, no erasing/fluid is allowed.
7. You have to mark all your responses ONLY on the ANSWER SHEET separately given according to 'INSTRUCTIONS FOR CANDIDATES' already supplied to you. Responses marked on the Test Booklet or in any paper other than the answer sheet shall not be examined.
8. All items carry equal marks. Attempt all items. Your total marks will depend only on the number of correct responses marked by you in the Answer Sheet. There will be no negative marking.
9. Before you proceed to mark responses in the Answer Sheet fill in the particulars in the front portion of the Answer Sheet as per the instructions sent to you.
10. If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct.
11. After you have completed the test, hand over the Answer Sheet only, to the Invigilator.

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P.T.O.

Time Allowed : 2 Hours]

[Maximum Marks : 100

1. The volume of the parallelepiped, whose edges are represented below, is :

$$\vec{a} = 2\hat{i} - 3\hat{j} + 4\hat{k}$$

$$\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$$

$$\vec{c} = 3\hat{i} - \hat{j} + 2\hat{k}$$

(A) 6

(B) 15

(C) 28

(D) 7

2.  $A_{im}^{ijk} B_i^m$ , is a tensor of rank :

(A) 7

(B) 3

(C) 5

(D) 6

3. Which of the following is a tensor of order zero ?

(A)  $\vec{A} + \vec{B}$ (B)  $\vec{A} - \vec{B}$ (C)  $\vec{A} \cdot \vec{B}$ (D)  $\vec{A} \times \vec{B}$ 

4. The associated Legendre's function  $P_2^2(x)$  will be equal to :

(A)  $\sqrt{1-x^2}$ (B)  $3x\sqrt{1-x^2}$ (C)  $3\sqrt{1-x^2}$ (D)  $3(1-x^2)$

5.  $\cos x$  is given by the following series :

(A)  $J_0(x) - 2J_2(x) + 2J_4(x) + \dots$

(B)  $2J_0(x) - 2J_1(x) + 2J_3(x) + \dots$

(C)  $2J_0(x) - 2J_3(x) + 2J_5(x) + \dots$

(D) None of the above

6. The residue of  $z/(z^2 - 1)$ , at infinity will be :

(A) 1

(B) Zero

(C) -1

(D) -2

7. If  $A = \begin{pmatrix} 3 \\ 0 \\ -1 \end{pmatrix}$  and  $B = (2, -1, 1)$ , then trace of  $AB$  will be :

(A) -1

(B) 1

(C) 3

(D) 5

8.  $\beta(4, 1)$  will be equal to :

(A) 4

(B)  $4/5$

(C)  $1/4$

(D)  $3/4$

9. Every group of prime order is :

(A) Cyclic

(B) Abelian

(C) Sub-group

(D) Normal group

10. Which of the following matrices is Hermitian ?

(A)  $\begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$

(B)  $\begin{bmatrix} 0 & i \\ -i & 0 \end{bmatrix}$

(C)  $\begin{bmatrix} i & 0 \\ 0 & i \end{bmatrix}$

(D)  $\begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}$

11. The radius of identical spheres arranged in *fcc* form of side  $a$  is :

(A)  $a/2$

(B)  $a/(2\sqrt{2})$

(C)  $\sqrt{3}a/2$

(D)  $\sqrt{3}a/4$

12. The angle between  $[0\ 0\ 1]$  and  $[1\ 0\ 1]$  directions in a cubic crystal is :

(A)  $30^\circ$

(B)  $35^\circ$

(C)  $40^\circ$

(D)  $45^\circ$

13. The potential energy of a diatomic molecule in terms of atomic distance  $R$  is given by :

$$U(R) = -\frac{A}{R^m} + \frac{B}{R^n},$$

where  $A$ ,  $B$ ,  $m$  and  $n$  are constant characteristics for the molecule. The equilibrium separation between atoms of the molecule will be :

- (A)  $\left(\frac{nA}{mB}\right)^{\frac{1}{n-m}}$                       (B)  $\left(\frac{nA}{mB}\right)^{\frac{1}{m-n}}$   
(C)  $\left(\frac{nB}{mA}\right)^{\frac{1}{m-n}}$                       (D)  $\left(\frac{nB}{mA}\right)^{\frac{1}{n-m}}$

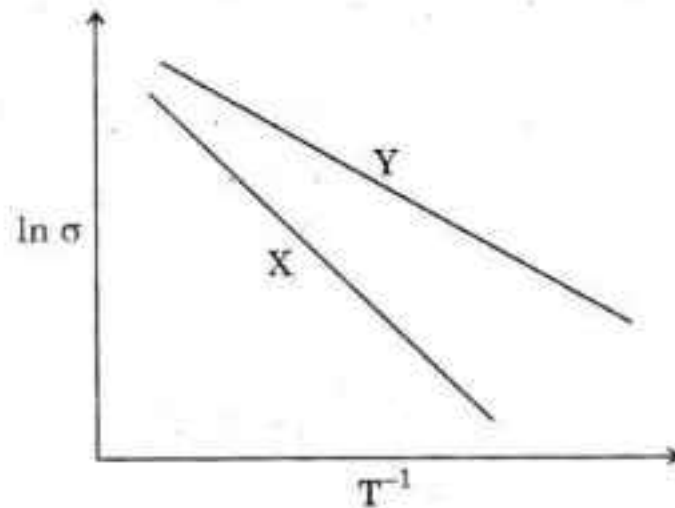
14. The concentration of Schottky imperfections ' $n$ ' in an ionic solid at a certain temperature  $T$  is given by :

- (A)  $N \exp\left(-\frac{E_p}{kT}\right)$                       (B)  $N \exp\left(\frac{E_p}{kT}\right)$   
(C)  $N \exp\left(-\frac{E_p}{2kT}\right)$                       (D)  $N \exp\left(\frac{E_p}{2kT}\right)$

15. In Debye's theory of specific heat of solids, the atomic oscillators obey :

- (A) MB statistics                      (B) FD statistics  
(C) BE statics                      (D) All of these

16. The temperature dependence of the electrical conductivity  $\sigma$  of two intrinsic semiconductors X and Y is shown in the figure. If  $E_X$  and  $E_Y$  are the band gaps of X and Y respectively, which one of the following is true ?



- (A)  $E_X > E_Y$   
(B)  $E_X < E_Y$   
(C)  $E_X = E_Y$   
(D) Both  $E_X$  and  $E_Y$  depend on temperature
17. If the band gap of an alloy semiconductor is 1.98 eV, then calculate the wavelength of radiation that is emitted when electrons and holes in the material recombine directly :

- (A) 6000 Å                      (B) 6500 Å  
(C) 6250 Å                      (D) 5750 Å

18. Soft superconductors observe :

(A) Meissner effect

(B) Silsbee's rule

(C) Both (A) and (B)

(D) None of these

19. For all metals, the ratio of the thermal conductivity to electrical conductivity is directly proportional to :

(A)  $T$

(B)  $T^2$

(C)  $T^{-1}$

(D)  $T^{-2}$

20. An ideal method for the determination of phonon spectra is :

(A) Neutron scattering

(B) Proton scattering

(C) Electron scattering

(D) Proton-proton scattering

21. A particle moving with a velocity of  $1/100$ th of that of light, will cross a nucleus in about :

(A)  $10^{-8}$  sec.

(B)  $10^{-12}$  sec.

(C)  $10^{-17}$  sec.

(D)  $10^{-20}$  sec.

22. Outside a nucleus :

(A) Neutron is stable

(B) Proton and neutron, both are stable

(C) Neutron is unstable

(D) Neither neutron nor proton is stable

23. Order of magnitude of density of uranium nucleus is ( $m_p = 1.67 \times 10^{-27}$  kg) :

(A)  $10^{20}$  kg/m<sup>3</sup>

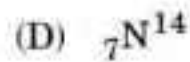
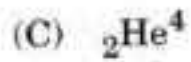
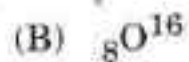
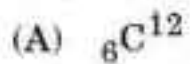
(B)  $10^{17}$  kg/m<sup>3</sup>

(C)  $10^{14}$  kg/m<sup>3</sup>

(D)  $10^{11}$  kg/m<sup>3</sup>



24. The packing fraction is zero for :



25. An admissible potential between the proton and neutron in a deuteron is :

(A) Coulomb

(B) Harmonic oscillator

(C) Finite square well

(D) Infinite square well

26. Suppose a neutron at rest, in free space decays into a proton and an electron,

this process would violate :

(A) Conservation of charge

(B) Conservation of energy

(C) Conservation of linear momentum

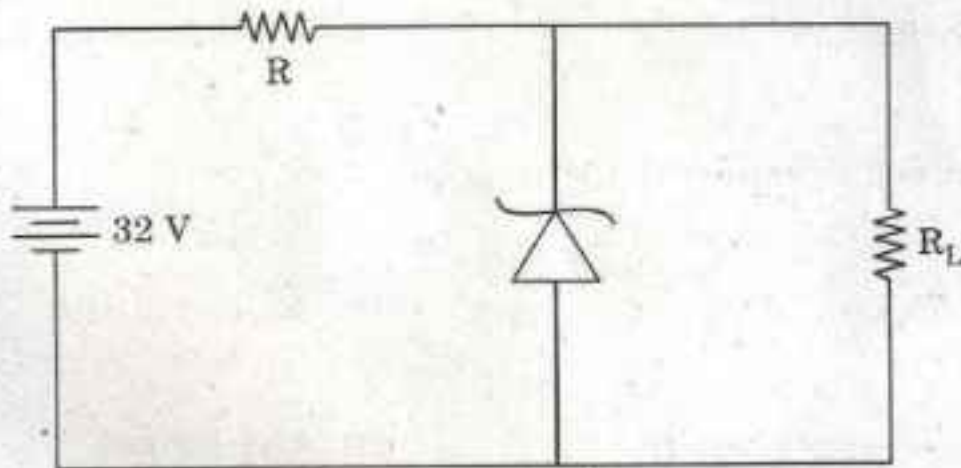
(D) Conservation of angular momentum

27. The hadrons can be divided into :
- (A) Photon and neutron                      (B) Muon and pion  
(C) Mesons and baryons                      (D) Tau and pion
28. Strongly interacting bosons are :
- (A) Leptons                                      (B) Mesons  
(C) Bosons                                      (D) Hyperons
29. Characteristic X-rays are :
- (A) Heterogeneous                              (B) Homogeneous  
(C) Both    (D) Can't say
30. In H spectrum, the wavelength of  $H_{\alpha}$  line is 656 nm, whereas in a distant galaxy, the wavelength of  $H_{\alpha}$  line is 706 nm. Estimate the speed of galaxy with respect to earth :
- (A)  $2 \times 10^8$  m/s                              (B)  $2 \times 10^7$  m/s  
(C)  $2 \times 10^6$  m/s                              (D)  $2 \times 10^5$  m/s

31. The population inversion in He-Ne laser is produced by :
- (A) Photo excitation (B) Inelastic atomic collisions  
(C) Electron excitation (D) Chemical reaction
32. The first line in the rotation spectrum of CO is  $3.842 \text{ cm}^{-1}$ . Its band length is (reduced mass of CO =  $11.384 \times 10^{-27} \text{ kg}$ ) :
- (A)  $0.11 \text{ \AA}$  (B)  $1.13 \text{ \AA}$   
(C)  $2.11 \text{ \AA}$  (D)  $2.13 \text{ \AA}$
33. The characteristic of Raman effect in crystal is :
- (A) The Raman lines obtained with crystals are sharp, becoming diffuse with rise of temperature  
(B) The Raman lines are broad  
(C) The Raman lines are blurred and non-intense  
(D) The Raman lines are weak and become diffused with decrease of temperature
34. Multiplicity of a term is defined as :
- (A)  $r = 2s$  (B)  $r = 2s - 1$   
(C)  $r = 2s + 1$  (D)  $r = s + 1$

35. If atoms could contain electrons with principal quantum numbers upto  $n = 6$ , how many electrons would there be :
- (A) 50 (B) 72  
(C) 172 (D) 182
36. Angular momentum quantisation is directly established by :
- (A) Stern-Gerlach experiment (B) Frank-Hertz experiment  
(C) Photoelectric effect (D) Devison-Germer experiment
37.  $(eB/4\pi mc^2)$ , is called :
- (A) Bohr magneton (B) Lorentz unit  
(C) Gyromagnetic ratio (D) Zeeman constant
38. A 60 V peak full wave rectified voltage is applied to a capacitor input filter. If  $f = 120$  Hz,  $R_L = 10$  k $\Omega$  and  $C = 10$   $\mu$ F, the ripple voltage is :
- (A) 0.6 V (B) 6 mV  
(C) 5.0 V (D) 2.88 V

39. A 24 V, 600 mW, Zener diode is to be used for providing a 24 V stabilized supply to a variable load. Assume that for proper Zener action, a minimum of 10 mA, must flow through the Zener. If the input voltage is 32 V, what should be the value of R and the maximum load current ?



- (A) 320  $\Omega$ , 10 mA                      (B) 400  $\Omega$ , 15 mA  
(C) 400  $\Omega$ , 10 mA                      (D) 320  $\Omega$ , 15 mA
40. Avalanche photodiodes are preferred over PIN diodes in optical communication system because of :
- (A) Speed of operation  
(B) Higher sensitivity  
(C) Larger bandwidth  
(D) Larger power handling capacity

41. As compared to a LED display, the distinct advantage of an LCD display is that it requires :

- (A) no illumination (B) extremely low power  
(C) no forward bias (D) a solid crystal

42. A solar cell operates on the principle of :

- (A) Diffusion (B) Recombination  
(C) Photovoltaic action (D) Carrier flow

43. What is the significant number of the value 10.002 ?

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

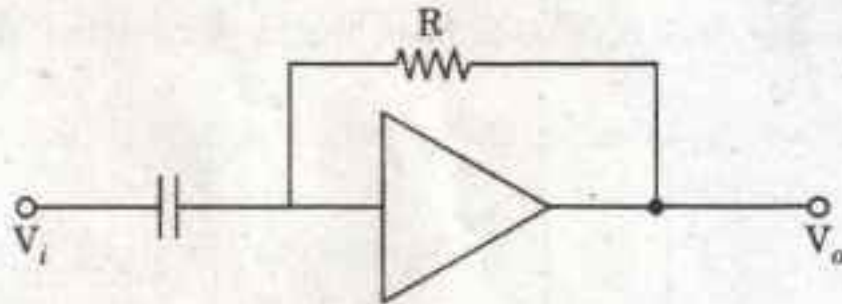
44. A Hall effect transducer can be used for measurement of :

- (A) Power (B) Electric current  
(C) Displacement (D) All of these

45. In an integrator, the feedback element is :

- (A) Resistor (B) Capacitor  
(C) Zener diode (D) Voltage divider

46. The following circuit is used for :



- (A) Summation (B) Subtraction  
(C) Integrator (D) Differentiation

47. Which of the following characteristics does not necessarily apply to an op-amp ?

- (A) High gain (B) Low power  
(C) High input impedance (D) Low output impedance

48. The Gibbs' potential is defined as :

- (A)  $G = U - PV + TS$  (B)  $G = U + PV + TS$   
(C)  $G = U - PV - TS$  (D)  $G = U + PV - TS$

49. The most probable velocity  $v_{mp}$  and the root mean square velocity  $c$  are related by :

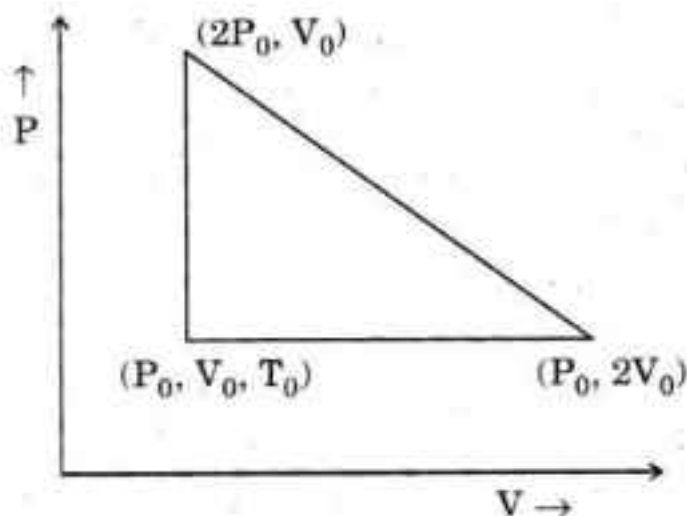
(A)  $v_{mp} = \sqrt{\frac{1}{2}}c$

(B)  $v_{mp} = \sqrt{\frac{2}{3}}c$

(C)  $v_{mp} = \sqrt{\frac{3}{8}}c$

(D)  $v_{mp} = \sqrt{\frac{1}{3}}c$

50. The efficiency of a reversible heat engine performing this cycle is :



(A) 1/4

(B) 1/6

(C) 1/8

(D) 1/10

51. Canonical ensemble is related to :

(A) The size of the system

(B) The freedom of the system

(C) The number of particles in the system

(D) Thermal equilibrium of systems



52. The transition of He-4, from the normal liquid state to superfluid state is known as :
- (A) Theory of everything (TOE)      (B)  $\lambda$ -transition  
(C) Bose-Einstein condensation      (D) Plait point
53. Which of the following is a first order phase transition ?
- (A) Vaporization of liquid at its boiling point  
(B) Ferromagnetic to paramagnetic  
(C) Normal liquid Helium to superfluid Helium  
(D) Superconductivity to normal state
54. The phenomenon of diffusion occurs in :
- (A) Gases only      (B) Solid, liquid and gases  
(C) Liquid only      (D) Solid only
55. Suppose the temperature of the sun goes down by a factor of two, then the total power emitted by the sun will go down by a factor of :
- (A) 2      (B) 4  
(C) 8      (D) 16

56. The expression  $|\psi(r, t)|^2$ , stands for :

(A) Position

(B) Position probability density

(C) Normalization

(D) Time probability density

57. The wave function in the ground state of hydrogen atom is given as :

$$\psi = Ae^{r/a}$$

where  $r$ -measures distance from nucleus and  $a$  is constant. The value of

A is :

(A)  $\frac{1}{\sqrt{\pi a}}$

(B)  $\frac{1}{\sqrt{\pi a^3}}$

(C)  $\frac{1}{\sqrt{\pi a^5}}$

(D)  $\frac{1}{\sqrt{\pi a^5}}$

58. Which of the following pairs of phenomena illustrates the particle aspect of wave-particle duality ?

(A) Compton effect and Bragg's law

(B) Compton effect and Pauli's principle

(C) Photoelectric effect and Compton effect

(D) Bragg's law and Photoelectric effect

59. For rigid sphere of radius  $a$ , the scattering cross-section at high energies is given as :

(A)  $2\pi a^2$

(B)  $\pi a^2$

(C)  $3\pi a^2$

(D)  $4\pi a^2$

60. The uncertainty relation applies to :

(A) Any pair of dynamical variables

(B) A pair of dynamical variables, the operators corresponding to which commute

(C) A pair of dynamical variables, the operators corresponding to which do not commute

(D)  $x$  and  $p_x$  only

61. The states corresponding to antisymmetric wave functions are called :

(A) Singlet state

(B) Doublet state

(C) Triplet state

(D) None of these

62. For a spherically symmetric probability cloud of an electron :
- (A) Principal quantum number is zero
  - (B) Orbital quantum number is zero
  - (C) Magnetic quantum number is zero
  - (D) Spin quantum number is zero
63. In the motion of two particles system, if two particles are connected by a rigid weightless rod of constant length, then the number of degrees of freedom of the system is :
- (A) 2
  - (B) 3
  - (C) 5
  - (D) 6
64. The velocity of a particle, when its kinetic energy equals its rest energy is :
- (A)  $2c$
  - (B)  $\sqrt{3}c/2$
  - (C)  $c$
  - (D)  $c/2$

65. Which one of the following particles experiences a Coriolis force ?
- (A) A particle at rest with respect to Earth at Bhopal.
  - (B) A particle thrown vertically upwards at Bhopal.
  - (C) A particle thrown vertically upwards at the North pole.
  - (D) A particle moving horizontally along the North-South direction.
66. A cube of edge  $s$  and mass  $M$ , is suspended vertically from one of its corners, then the length of the equivalent simple pendulum is :
- (A)  $(4/3)s$
  - (B)  $(2/3)s$
  - (C)  $(2\sqrt{2}/3)s$
  - (D)  $2\sqrt{2}s$
67. A particle moves in a circular orbit about the origin under the action of a central force  $\vec{F} = -k\hat{r}/r^3$ . If the potential energy is zero at infinity, the total energy of the particle is :
- (A)  $-k/r^2$
  - (B)  $-k/2r^2$
  - (C) Zero
  - (D)  $k/r^2$

68. For which scattering angle, for equal masses, the recoil particle (scatterer) takes the whole incident energy ?

(A)  $\pi$

(B)  $\pi/2$

(C)  $3\pi/2$

(D) Zero

69. If  $H$  is constant of motion, what is the value of,  $((p, H), H)$  ?

(A)  $p$

(B)  $\dot{p}$

(C)  $\ddot{p}$

(D)  $-\dot{p}$

70. If  $(X, H) = 0$  and  $(Y, H) = 0$ , what is the value of  $(H(X, Y))$  ?

(A) 0

(B) 1

(C) -1

(D) None of these

71. If magnetic monopole existed, then which of the following Maxwell's equations will be modified ?

(A)  $\text{div } \vec{D} = \rho$

(B)  $\text{div } \vec{B} = 0$

(C)  $\text{curl } \vec{R} = -\frac{\partial \vec{B}}{\partial t}$

(D)  $\text{curl } \vec{H} = \vec{J} + \frac{\partial \vec{D}}{\partial t}$

72. In electromagnetic wave the phase difference between electric and magnetic field vectors  $\vec{E}$  and  $\vec{B}$  is (except in conducting medium) :

- (A) 0 (B)  $\pi/2$   
(C)  $\pi$  (D)  $\pi/4$

73. A plane-polarised monochromatic electromagnetic wave incident on a plane interface at the Brewster angle gives rise to a reflected wave, which is :

- (A) Partially polarized  
(B) Unpolarized  
(C) Polarized parallel to the interface  
(D) Polarized perpendicular to the interface

74. The magnetic scalar potential for a point on the  $z$ -axis of a circular loop of radius  $a$  is given by :

- (A)  $\frac{\mu_0}{4\pi} 2\pi I \left[ 1 - \frac{z}{(a^2 + z^2)^{1/2}} \right]$  (B)  $\frac{\mu_0}{4\pi} 2\pi I \left[ 1 - \frac{z}{(a^2 + z^2)^{3/2}} \right]$   
(C)  $\frac{\mu_0}{4\pi} 2\pi I \left[ \frac{z}{(a^2 + z^2)^{3/2}} \right]$  (D)  $\frac{\mu_0}{4\pi} 2\pi I \left[ \frac{a}{(a^2 + z^2)^{3/2}} \right]$

75. The power radiated by an electric dipole is proportional to the frequency by :
- (A)  $\omega$  (B)  $\omega^2$   
(C)  $\omega^3$  (D)  $\omega^4$
76. A transmission line, whose characteristic impedance is a pure resistance :
- (A) must be a lossless line  
(B) must be a distortionless line  
(C) may not be a lossless line  
(D) may not be a distortionless line
77. The cut-off wavelength  $\lambda_c$  for  $TE_{20}$  mode, for a standard rectangular wave guide is :
- (A)  $2/a$  (B)  $2a$   
(C)  $a$  (D)  $2a^2$



78. In a circular wave guide with radius  $r$ , the dominant mode is :

(A)  $TM_{01}$

(B)  $TE_{01}$

(C)  $TM_{11}$

(D)  $TE_{11}$

79. The vector potential of an infinite solenoid, with  $n$  turns per unit length,

radius  $R$  and current  $I$  inside it, will be :

(A)  $\frac{\mu_0 n I}{2} r \hat{\phi}$

(B)  $\frac{\mu_0 n I R^2}{2 r} \hat{\phi}$

(C)  $\frac{\mu_0 n I}{2} R^2 \hat{\phi}$

(D)  $\frac{\mu_0 n I}{2} \frac{1}{r} \hat{\phi}$

80. The energy of e.m. wave in vacuum is given by relation :

(A)  $\frac{1}{2} \epsilon_0 E^2 + B^2 / (2\mu_0)$

(B)  $E^2 / (2\epsilon_0) + B^2 / (2\mu_0)$

(C)  $\frac{1}{2} \epsilon_0 E^2 + \frac{1}{2} \mu_0 B^2$

(D)  $(E^2 + B^2) / C$

81. Which of the following lakes is situated near Rohtang Pass of H.P. ?
- (A) Nako (B) Sukhsar  
(C) Prashar (D) Bhrigu
82. According to 2011 census, what is the density of population in H.P. (per sq. km) ?
- (A) 123 (B) 133  
(C) 143 (D) 153
83. On which river is the proposed Renukaji Dam Hydro-Electric Power Project ?
- (A) Yamuna (B) Tons  
(C) Andhra (D) Giri
84. In which Tehsil of Shimla District of H.P. is Talra Sanctuary ?
- (A) Jubbal (B) Rohru  
(C) Theog (D) Chopal

85. In which district of H.P. is the average size of operational holdings smallest in the state ?
- (A) Bilaspur (B) Mandi  
(C) Kullu (D) Chamba
86. Under the *Rashtriya Krishi Vikas Yojna* what is the target of achieving annual growth in the agriculture in H.P. during the Eleventh Five Year Plan ?
- (A) 3 percent (B) 4 percent  
(C) 5 percent (D) 6 percent
87. When did the Union Parliament pass the state of Himachal Pradesh Act to elevate the status of H.P. from a U.T. to a full-fledged state ?
- (A) July 1970 (B) October 1970  
(C) December 1970 (D) January 1971

88. The original name of which of the following towns of Kangra District was Kiragrama ?

(A) Dharamsala

(B) Palampur

(C) Nurpur

(D) Baijnath

89. Which raja of Kehlur (Bilaspur) princely state sent an invitation to the Gurukha Commander Amar Singh Thapa to invade the Kangra princely state ?

(A) Bhim Chand

(B) Mahan Chand

(C) Hira Chand

(D) Bijai Chand

90. Who is the author of *Kangra Valley Paintings* ?

(A) H.C. Saraswat

(B) M.S. Randhawa

(C) G.D. Khosla

(D) R.M. Bernier

91. Who became the Prime Minister of Nepal after the resignation of K.P. Oli ?

- (A) Bidhya Devi Bhandari
- (B) Pushpa Kamal Dahal Prachand
- (C) Sher Bahadur Deuba
- (D) Onsari Gharti

92. Which day is observed as Universal Children's Day ?

- (A) October 02
- (B) November 14
- (C) November 20
- (D) December 16

93. Who is Vijay Rupani ?

- (A) Governor of Asom
- (B) Theatre person of Maharashtra
- (C) Chief Minister of Gujarat
- (D) None of the above

94. There are two routes to Mansarovar lake pilgrimage from India, one is via Nathula. Which is the other ?

(A) Via Lipulekh Pass

(B) Via Kargil

(C) Via Bomdila

(D) Via Sonamarg

95. Which Indian state created the Ministry of Happiness around July 2016 ?

(A) Sikkim

(B) Goa

(C) Uttarakhand

(D) Madhya Pradesh

96. In which city of Odisha is Sum Hospital where several people died in a fire that broke out in October 2016 ?

(A) Bhubaneswar

(B) Brahmapur

(C) Malkangiri

(D) Puri

97. Which was the first Indian state to ratify the Goods and Service Tax (GST) Constitutional Amendment Bill ?

- (A) Bihar (B) Asom  
(C) Gujarat (D) Haryana

98. With which game/sport is Kagiso Rabada of South Africa associated ?

- (A) Football (B) Athletic  
(C) Cricket (D) Boxing

99. In which country is war ravaged Mosul town ?

- (A) Iraq (B) Afghanistan  
(C) Iran (D) None of these

100. In which category did Bob Dylan win the 2016 Nobel Prize ?

- (A) Physics (B) Medicine  
(C) Literature (D) Economics