

COMMON P. G. ENTRANCE TEST – 2023 (CPET-2023)Test Booklet No. : **0191**Subject Code : **35**Hall Ticket No. : Subject : **PHYSICS****TEST BOOKLET**Time Allowed : **60 Minutes**Full Marks : **80****: INSTRUCTIONS TO CANDIDATES :**

1. The Test Booklet contains **23** pages including the cover page and **80** (Question No. 1 to 80) multiple choice questions.
2. DO NOT break the seal of the Test Booklet until the invigilator instructs to do so.
3. The candidates must check discrepancy, if any (like up-printed or torn or missing pages or missing questions) in the Test Booklet immediately after breaking the seal of the Test Booklet. If detected, the invigilator may be requested to replace the same.
4. Candidates are required to fill up and darken the **Hall Ticket No, Test Booklet Serial No.** and OMR Answer Sheet Serial No. in attendance sheet carefully. Wrongly filled in OMR Answer Sheet is liable for rejection.
5. Each question has four choices / answers marked (A), (B), (C), (D). Candidate has to select the most appropriate choice / answer to each question and darken the oval completely against the question number provided in the OMR Answer Sheet.
6. Indicate only one choice / answer from the options provided by darkening the appropriate oval in the OMR Answer Sheet. More than one response to a question shall be treated as a wrong answer.
7. Use only **Black Ball Point Pen** for darkening the oval for answering.
8. All the questions are compulsory and they carry equal marks. The total marks scored by a candidate depends on the number of correct choices / answers darkened in the OMR Answer Sheet. There will be no negative marking for wrong answers.
9. No candidate shall be allowed to leave the Examination Hall / Room till all OMR Answer Sheets have been collected by the invigilator.
10. On completion of the entrance test, the original OMR Answer Sheet be handed over to the invigilator. Candidates are allowed to take the second copy of the OMR Answer Sheet along with the used Test Booklet for reference.
11. Candidates are not allowed to carry any personal belongings including electronic devices such as scientific calculator, cell phones, headphones, ear buds, or any other type of devices that allow communication of any kind inside the Examination Room / Hall.
12. The candidates are advised not to scribble or make any mark on the OMR Answer Sheet except marking the answers at the appropriate places and filling up the details required. Rough work, if any, may be done in the blank sheet(s) provided at the end of the Test Booklet.
13. Any malpractice / use of unfair means will lead to your disqualification from the entrance test / admission process and may also lead to appropriate legal action as deemed fit.

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

PN – 35/15

(Turn over)

SEAL

(2) (Continued)

1. If three particles each of same mass are at points (1, 2, 3), (2, 3, 4) and (3, 4, 5), then the centre of mass of the system is at :
- (A) (1, 3, 2)
(B) (2, 3, 4)
(C) (4, 3, 1)
(D) (3, 4, 5)
2. If a particle is at rest in a rotating reference frame, the magnitude of Coriolis force acting on the particle is :
- (A) $m\omega^2$
(B) $\frac{m\omega^2}{r}$
(C) zero
(D) $m\omega$
3. Moment of inertia of a solid sphere about a tangent is :
- (A) $\frac{2}{5}Mr^2$
(B) $\frac{Mr^2}{2}$
(C) $\frac{7}{5}Mr^2$
(D) Mr^2
4. The theoretical value of Poisson's ratio lies between :
- (A) - 1 to +0.5
(B) - 0.5 to +0.5
(C) - 1 to +1
(D) - 2 to 0.5

5. The depression at the middle of a light double Cantilever supported at the ends and loaded at the middle is proportional to :
- (A) ℓ^2
(B) ℓ^3
(C) $\frac{1}{\ell}$
(D) $\frac{1}{\ell^2}$

where ℓ is the separation between the ends.

6. If the pressure inside two soap bubbles are 1.01atmosphere and 1.02 atmosphere, the ratio of their respective volumes are :
- (A) 2
(B) 4
(C) 8
(D) 16
7. If a Planet moves around the Sun in an elliptical orbit with semi major axis 'a' and time period 'T', then T is proportional to :
- (A) a^2
(B) a
(C) $a^{1/2}$
(D) $a^{3/2}$
8. Which statement is not true for central force problem ?
- (A) Central force is conservative
(B) Angular momentum is conserved
(C) Areal velocity is constant
(D) Mechanical energy is not conserved

9. The magnitude of gravitational field at the centre of a solid sphere of radius r is :

(A) Zero

(B) $\frac{MG}{r}$

(C) $\frac{MG}{r^2}$

(D) $\frac{MG}{r^3}$

10. The time period for damped oscillatory motion is :

(A) $2\pi\sqrt{\frac{m}{k}}\left(1+\frac{b^2}{4mk}\right)$

(B) $2\pi\sqrt{\frac{m}{k}}\left(1-\frac{b^2}{4mk}\right)$

(C) $2\pi\sqrt{\frac{m}{k}}\left(1-\frac{b^2}{4mk}\right)^{-1/2}$

(D) $2\pi\sqrt{\frac{m}{k}}b$

where b is damping factor, m is mass and k is spring constant.

11. For a conservative system, generalized force :

(A) Has necessarily the dimensions for force

(B) Dimension less

(C) Cannot have dimensions of force

(D) May have the dimensions of torque

12. Hamilton's canonical equations are :

(A) $\dot{q}_k = \frac{\partial H}{\partial p_k}, \dot{p}_k = \frac{\partial H}{\partial q_k}, \frac{\partial L}{\partial t} = \frac{\partial H}{\partial t}$

(B) $\dot{q}_k = \frac{\partial H}{\partial p_k}, \dot{p}_k = \frac{-\partial H}{\partial q_k}, \frac{-\partial L}{\partial t} = \frac{\partial H}{\partial t}$

(C) $\dot{q}_k = \frac{-\partial H}{\partial p_k}, \dot{p}_k = \frac{\partial H}{\partial q_k}, \frac{\partial L}{\partial t} = \frac{\partial H}{\partial t}$

(D) $\dot{q}_k = \frac{-\partial H}{\partial p_k}, \dot{p}_k = \frac{-\partial H}{\partial q_k}, \frac{-\partial L}{\partial t} = \frac{\partial H}{\partial t}$

13. If Lagrangian for a particle of mass m moving in a plane is :

$$L = \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 + xy - y\dot{x}, \text{ then } p_x \text{ of the particle is :}$$

- (A) $m\dot{x}$
- (B) $m\dot{y} + x$
- (C) $m\dot{x} - y$
- (D) $m\dot{x} + y$

14. Velocity profile of the liquid flowing through a narrow tube has :

- (A) Circular shape
- (B) Elliptical shape
- (C) Parabolic shape
- (D) Straight line

15. For momentum to be conserved the Lagrangian is to be of form :

(A) $L = \frac{1}{2} m \dot{q}^2 - U(q)$

(B) $L = U(q)$

(C) $L = \frac{1}{2} m \dot{q}^2$

(D) $L = \frac{1}{2} m \dot{q}^2 - U(q, \dot{q})$

16. If an electron is travelling with velocity $0.98c$. The mass of electron that appears to stationary observer in lab is :

- (A) $5m_0$
- (B) $2m_0$
- (C) $3m_0$
- (D) $4m_0$

17. The order and degree of equation $x^2 \frac{d^2y}{dx^2} + 2x \frac{dy}{dx} + y = 0$ is :

- (A) 1, 1
- (B) 2, 2
- (C) 2, 1
- (D) 1, 2

18. Wronskian for $y_1 = \sin 2x$, $y_2 = \cos 2x$ is :

- (A) 1
- (B) -2
- (C) $\sin x$
- (D) 3

19. Taylor series expansion of e^{-z} about point $z = a = 0$:

- (A) $1 - \frac{z^2}{2!} + \frac{z^3}{3!} - \dots$
- (B) $1 - z + \frac{z^2}{2!} - \frac{z^3}{3!} + \dots$
- (C) $1 + z - \frac{z^2}{2!} + \frac{z^3}{3!} \dots$
- (D) $1 - \frac{z^2}{2!} + \frac{z^4}{4!} \dots$

20. Volume of tetrahedron with sides $2\hat{i} + 3\hat{j} - 4\hat{k}$, $\hat{i} + 2\hat{j} - \hat{k}$, $2\hat{i} + 3\hat{j} + 4\hat{k}$ is :

- (A) 4
- (B) $\frac{3}{2}$
- (C) $\frac{8}{3}$
- (D) $\frac{4}{3}$

21. The unit vector $\hat{e}_r$ normal to the surface $r = \text{constant}$ can be expressed as :

- (A) $\hat{e}_r = \cos\theta \cos\phi \hat{i} + \sin\theta \sin\phi \hat{j} + \cos\phi \hat{k}$
- (B) $\hat{e}_r = \sin\theta \cos\phi \hat{i} + \sin\theta \sin\phi \hat{j} + \cos\theta \hat{k}$
- (C) $\hat{e}_r = -\sin\phi \hat{i} + \cos\phi \hat{j} + \cos\theta \hat{k}$
- (D) $\hat{e}_r = \cos\theta \cos\phi \hat{i} - \sin\theta \sin\phi \hat{j} - \cos\phi \hat{k}$

22. $\nabla \times \left(\frac{\vec{r}}{|\vec{r}|^3} \right)$ for $\vec{r} = \hat{i}x + \hat{j}y + \hat{k}z$ is :

(A) 0

(B) $\vec{r}$

(C) $-\frac{3\vec{r}}{|\vec{r}|^5}$

(D) $\frac{\vec{r}}{|\vec{r}|^3}$

23. If V is volume enclosed by the closed surface s then $\oint_s \hat{r} \cdot d\vec{s} = ?$

(A) 2V

(B) 3V

(C) V

(D) 4V

24. $x \delta'(x)$ is equal to :

(A) x

(B) 0

(C) $-\delta(x)$

(D) $\delta(x)$

25. a_0 in Fourier series expansion of the function, $T(x, 0) = \frac{100}{L}x$ for $-L < x < L$ is :

(A) $\frac{100}{n\pi}$

(B) $\frac{200}{n\pi}(-1)^{n+1}$

(C) $\frac{200}{n\pi}$

(D) 0 (zero)

26. For Laplace's equation the solution of the radial part 'R' is :

(A) $A r^n + B r^{-n-2}$

(B) $A r^n + B r^{-n-1}$

(C) $A r^{-n} + B r^{2n}$

(D) $A r^{2n} + B r^{-n-2}$

27. For $x \frac{dy}{dx} + 2y = x^3$, the integrating factor is :

(A) x

(B) x^3

(C) $\frac{1}{x}$

(D) x^2

28. $15x^3 - 9x$ in terms of Legendre polynomial is :

(A) $6 P_3(x)$

(B) $4 P_2(x)$

(C) $4 P_3(x)$

(D) $6 P_3(x) + 4 P_2(x)$

29. Hermite polynomial $H_2(x)$ is :

(A) $2x$

(B) $8x^3 - 12x$

(C) $4x^2 - 2$

(D) $12x^2 - 3x$

30. $\Gamma\left(\frac{1}{2}\right)$ is equal to :

(A) π

(B) $\pi/2$

(C) $\sqrt{\pi}/2$

(D) $\sqrt{\pi}$

31. $\beta\left(\frac{1}{2}, \frac{1}{2}\right)$ is equal to :

(A) $\sqrt{\pi}$

(B) π^2

(C) $\frac{1}{\pi}$

(D) π

32. $\int_0^{2\pi} \frac{d\theta}{25 + 24\cos\theta}$ is :

(A) π

(B) $\frac{2\pi}{3}$

(C) $\frac{2\pi}{7}$

(D) 2π

33. Laplace transform of function $F(t) = \frac{e^{at} - 1}{a}$ is :

(A) $\frac{1}{s(s-a)}$

(B) $\frac{1}{s} \left(\frac{1}{s+a} \right)$

(C) $\frac{s}{s+a}$

(D) $\frac{s}{s-a}$

where $s > 0$ and $s > a$.

34. The first two terms of Laurent series expansion for $f(z) = \frac{1}{z(z-2)}$ for $0 < |z| < 2$ are :

(A) $-\frac{z}{2^2} - \frac{z^4}{2^4}$

(B) $-\frac{1}{2z} - \frac{1}{2^2}$

(C) $\frac{z}{2^2} - \frac{z}{2^3}$

(D) $-\frac{z}{2^3} - \frac{z^4}{2^4}$

35. The residues of $f(z) = \frac{e^z}{z^2 + a^2}$ at singularities :

(A) $\frac{e^{ia}}{2ia}, \frac{e^{-ia}}{2ia}$

(B) $\frac{e^{ia}}{ia}, \frac{e^{-ia}}{ia}$

(C) $\frac{e^{ia}}{2ia}, \frac{-e^{-ia}}{2ia}$

(D) $\frac{e^{ia}}{ia}, \frac{-e^{-ia}}{ia}$

36. The net outward flux of electric field E through the closed surface in the form of cylinder and $\vec{E}$ is parallel to axis of cylinder is :

(A) Zero

(B) πER^2

(C) $-\pi ER^2$

(D) $2\pi RE$

R being radius of cylinder.

37. At any point r on the perpendicular bisector of the dipole axis the potential ' ϕ ' due to dipole is :

(A) $\phi \propto \frac{1}{r}$

(B) $\phi \propto \frac{1}{r^2}$

(C) Zero

(D) $\phi \propto \frac{1}{r^3}$

38. An electron is accelerated from rest through a potential difference of v and experiences a force F in a uniform magnetic field entering at right angle to it on increasing the potential to v' it experiences force $2F$ in same magnetic field describing the same path. The ratio of $\frac{v'}{v}$ is :
- (A) $1/4$
 (B) 2
 (C) $1/2$
 (D) 4
39. The peak value of an alternating emf, $E = E_0 \cos \omega t$ is 10 volt and frequency is 50 Hz. The value of emf at $t = \frac{1}{600}$ sec is :
- (A) 10 Volt
 (B) $5\sqrt{3}$ Volt
 (C) 5 Volt
 (D) 1 Volt
40. If magnetic flux linked with a stationary loop of resistance R varies with respect to time during the time period as $\phi = at(T - t)$, amount of heat generated in the loop during that time T is :
- (A) $\frac{a^2 T^3}{3R}$
 (B) $\frac{aT}{3R}$
 (C) $\frac{a^2 T^2}{3R}$
 (D) $\frac{aT^2}{3R}$

41. $\vec{\nabla} \times \vec{E} = - \frac{\partial \vec{B}}{\partial t}$ equation is related :

- (A) Gauss law
- (B) Biot-Savart law
- (C) Ampere's law
- (D) Faraday's law of electromagnetic induction

42. If $E(\vec{k}, \vec{r} - vt)$ and $B(\vec{k}, \vec{r} - vt)$ satisfy Maxwell equations, then $\frac{|E|}{|B|}$ is equal to :

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

C is velocity of electromagnetic wave.

43. For normal incidence, reflection coefficient of the surface is given by :

- (A) $\left(\frac{n_1 - n_2}{n_1 + n_2} \right)^2$
- (B) $\left(\frac{2n_1}{n_1 + n_2} \right)^2$
- (C) $\frac{n_2}{n_1}$
- (D) $\left(\frac{n_2 + n_1}{n_2 - n_1} \right)^2$

where n_1 and n_2 are refractive indices of medium one and two respectively.

44. If a beam of polarised light has $\frac{1}{4}$ th of its initial intensities after passing through an analyzer, then the angle between the axis of the analyzer and its initial amplitude of the beam is :
- (A) 30°
(B) 45°
(C) 60°
(D) 90°
45. The thickness of half waveplate for wavelength $5000 \text{ \AA}$ is $[\mu_E = 1.55; \mu_O = 1.54]$:
- (A) $2.6 \times 10^{-3} \text{ cm}$
(B) $5 \times 10^{-3} \text{ cm}$
(C) $2.7 \times 10^{-3} \text{ cm}$
(D) $2.5 \times 10^{-3} \text{ cm}$
46. If two thin convex lenses having focal lengths 5 cm and 4 cm are coaxial and separated by a distance of 4 cm, then the equivalent focal length is :
- (A) 5 cm (B) 4 cm
(C) 6 cm (D) 2 cm
47. Condition for bright and dark fringes for Newton's rings in transmitted and reflected light are reversed because :
- (A) Transmitted ray has a phase reversal of $\pi/2$
(B) Reflected ray has a phase reversal of $\pi/2$
(C) Transmitted ray has a phase reversal of π
(D) Reflected ray has a phase reversal of π and transmitted ray has no phase reversal

48. Radius of first half period zone of a zone plate behaving like a convex lens of focal length 50cm with $\lambda = 5000\text{\AA}$ is :

- (A) $10 \times 10^{-2} \text{ cm}$
- (B) 0.1 cm
- (C) $5 \times 10^{-2} \text{ cm}$
- (D) 0.2 cm

49. The product of group velocity and phase velocity of a relativistic particle is :

- (A) C
- (B) $\frac{1}{C}$
- (C) C^2
- (D) $\frac{1}{C^2}$

C is light velocity

50. If a particle of mass $3m$ is at rest and decays into two particles of mass m and $2m$ with non-zero velocities then, the ratio of the de-Broglie wavelength of the particles of mass m and $2m$ is :

- (A) $1/2$
- (B) 1
- (C) 2
- (D) $\frac{1}{4}$

51. If difference between n th and $(n+1)$ th Bohr radius of hydrogen atom is equal to its $(n-1)$ th Bohr's radius, then the value of n is :

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

52. If mass number of a nucleus is 'A' then the Coulomb energy term E_c in Weiz Sacker's mass formula is related to A as :

(A) $E_c \propto \frac{1}{A}$

(B) $E_c \propto \frac{1}{A^{2/3}}$

(C) $E_c \propto A$

(D) $E_c \propto \frac{1}{A^{1/3}}$

53. If the half life of radioactive decay is x times its mean life, then x is :

(A) 0.3010

(B) 0.6930

(C) 0.6020

(D) $\frac{1}{0.6930}$

54. For wave function $\psi(x) = N e^{\frac{-x^2}{2}}$, Normalisation constant N is :

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

(B) $\left(\frac{1}{\pi}\right)^{2/3}$

(C) $\left(\frac{1}{\pi}\right)^{1/4}$

(D) $\sqrt{\pi}$

55. The expectation value of P_x for the wave function, $\psi(x) = \left(\frac{2}{L}\right)^{1/2} \sin \frac{\pi x}{L}$ for $0 < x < L$, $\psi(x) = 0$ for $|x| > L$ is :
- (A) Zero
- (B) $\frac{1}{L}$
- (C) L
- (D) L^2
56. If the zero point energy of one dimensional harmonic oscillator is $5.25 \times 10^{-27} \text{ J}$, then the energy of second excited state is :
- (A) $1.05 \times 10^{-27} \text{ J}$
- (B) $10.5 \times 10^{-27} \text{ J}$
- (C) $2.1 \times 10^{-27} \text{ J}$
- (D) $26.25 \times 10^{-27} \text{ J}$
57. Change in kinetic energy due to Larmor precession in case of an electron orbiting in magnetic field 'B' is :
- (A) $\frac{L B e}{2m}$
- (B) $\frac{L B e}{m}$
- (C) $\frac{B e}{m}$
- (D) $\frac{L B^2 e}{m}$

L is the original angular momentum.

58. Choose the incorrect statement :

- (A) Change of entropy in reversible cyclic process is zero.
- (B) Change in entropy is path independent in any thermodynamic change of a system.
- (C) In irreversible process total entropy of system and its surrounding does not change.
- (D) The entropy can never decrease in any process.

59. For one mole of Van der Waals's gas, $\left(\frac{\partial U}{\partial V}\right)_T$ is equal to :

- (A) $\frac{a}{V}$
- (B) $\frac{a}{V^2}$
- (C) aV
- (D) $\frac{a}{V^3}$

'a' is Van der Waals constant, V is the volume.

60. Most probable speed C_{mp} of gas molecules in absolute temperature(T) is :

- (A) $C_{mp} \propto \sqrt{T}$
- (B) $C_{mp} \propto \frac{1}{T}$
- (C) $C_{mp} \propto \frac{1}{\sqrt{T}}$
- (D) $C_{mp} \propto T$

61. Inversion temperature in Joule-Thomson effect in case of Van der Waals's gas :

(A) $\frac{2a}{Rb}$

(B) $2 Rab$

(C) $\frac{b}{Ra}$

(D) $\frac{a}{Rb}$

a, b are Van der Waals' constant.

62. If a plane intercepts 2a, 3b, c in a simple cubic unit cell, then the Miller indices of the plane is :

(A) (2, 3, 6)

(B) (6, 3, 2)

(C) (3, 6, 2)

(D) (3, 2, 6)

63. Reciprocal lattice vectors of BCC structure are :

(A) $\frac{2\pi}{a} (\hat{i} + \hat{j} - \hat{k}), \frac{2\pi}{a} (\hat{i} - \hat{j} - \hat{k}), \frac{2\pi}{a} (\hat{i} - \hat{j} + \hat{k})$

(B) $\frac{2\pi}{a} (\hat{i} + \hat{j} + \hat{k}), \frac{2\pi}{a} (\hat{i} - \hat{j}), \frac{2\pi}{a} (\hat{k} - \hat{i})$

(C) $\frac{2\pi}{a} (\hat{i} + \hat{j} - \hat{k}), \frac{2\pi}{a} (\hat{i} - \hat{j}), \frac{2\pi}{a} (\hat{j} - \hat{k})$

(D) $\frac{2\pi}{a} (\hat{i} + \hat{j}), \frac{2\pi}{a} (\hat{j} + \hat{k}), \frac{2\pi}{a} (\hat{k} + \hat{i})$

64. Dispersion relation for linear vibration of one dimensional monoatomic lattice is :

(A) $w = \pm \sqrt{\frac{\beta}{m}} \sin\left(\frac{ka}{2}\right)$

(B) $w = \pm \sqrt{\frac{\beta}{2m}} \cos\left(\frac{ka}{2}\right)$

(C) $w = \pm \sqrt{\frac{4\beta}{m}} \sin\left(\frac{ka}{2}\right)$

(D) $w = \pm \sqrt{\frac{2\beta}{m}} \sin\left(\frac{ka}{2}\right)$

$\beta \rightarrow$ force constant.

65. $\frac{\epsilon_r - 1}{\epsilon_r + 2} = \frac{N\alpha_e}{3\epsilon_0}$ is known as for

$\epsilon_0 \rightarrow$ free space permittivity

$\epsilon_r \rightarrow$ relative permittivity

$\alpha_e \rightarrow$ electronic polarisability :

(A) Lorentz relation

(B) Clausius–Mosotti relation

(C) Einstein relation

(D) Curie law

66. Transition temperature T_c and critical field H_c for super conductor are related as :

(A) $H_c = H_0 \left[1 - \left(\frac{T}{T_c} \right)^2 \right]$

(B) $H_c = H_0 (T_c + 1)$

(C) $T_c = T_0 \left[1 - \left(\frac{H_0}{H_c} \right)^2 \right]$

(D) $H_c = H_0 (T_c - 1)$

67. Interaction between neighbouring dipoles is negligible in case of :

(A) Diamagnetic material

(B) Antiferromagnetic material

(C) Paramagnetic material

(D) Ferrimagnetic material

68. In Kronig-Penney model the large scattering power of potential suggests for energy bands and electrons as :

(A) Allowed bands are narrower

(B) Allowed bands are wider

(C) Forbidden bands are narrower

(D) Electrons are less bound

69. At non-zero temperature Fermi Dirac distribution function is $\frac{1}{2}$ when energy E is :

- (A) $E = 0$
- (B) $E > E_F$
- (C) $E < E_F$
- (D) $E = E_F$

$E_F \rightarrow$ Fermi energy.

70. Choose the wrong statement for Bose-Einstein statistics :

- (A) It holds for indistinguishable particles
- (B) Does not obey Pauli's exclusion principle
- (C) $f(E) = \frac{1}{e^{(E-E_F)/k_B T} + 1}$
- (D) Applies to phonons and photons

71. If z is the partition function for an ideal gas, then total internal energy U is :

- (A) $Nk_B \ln z$
- (B) $Nk_B T^2 \frac{\partial}{\partial T} (\ln z)$
- (C) $Nk_B T \ln z$
- (D) $Nk_B T^2 \ln z$

72. Product of wavelength corresponding to maximum energy λ_m and absolute temperature T is a constant ($\lambda_m T = \text{constant}$) is :

- (A) Stefan-Boltzmann law
- (B) Rayleigh-Jeans law
- (C) Wein's distribution law
- (D) Wein's placement law

73. Ripple factor for a full wave rectifier is :

- (A) 0.482
- (B) 1.21
- (C) 1.1
- (D) 2.1

74. If the emitter collector current gain factor α is 0.95 then the base collector current gain factor β is :

- (A) 25
- (B) 10
- (C) 19
- (D) 30

75. For Hartley oscillator $L_1 = 8 \text{ mH}$, $L_2 = 12 \text{ mH}$, $M = 8 \text{ mH}$, $C_1 = 10 \mu\text{F}$, then frequency f is :

(A) $f = \frac{1}{2\pi} \left(\frac{10^4}{8} \right) \text{ HZ}$

(B) $f = \frac{1}{2\pi} \frac{10^4}{6} \text{ HZ}$

(C) $f = \frac{1}{2\pi} \frac{10^4}{9} \text{ HZ}$

(D) $f = \frac{1}{2\pi} \frac{10^4}{7} \text{ HZ}$

76. The ideal OP-AMP has :

- (A) An infinite voltage gain
- (B) Finite input impedance
- (C) Finite bandwidth
- (D) Non zero output impedance

77. Addition of 11001100 and 10001010 is :
- (A) 101010010 (B) 100010001
(C) 101010110 (D) 110010110
78. The Lissajous figure is produced by application of Sinusoidal voltages to vertical and horizontal deflecting plates of CRO. The pattern gives 4 tangencies with vertical and 3 tangencies with the horizontal. The frequency of the vertical signal for 1 kHz horizontal signal is :
- (A) 500 Hz (B) 750 Hz
(C) 1333.3 Hz (D) 250 Hz
79. Boolean identity $ABC + A\bar{B}C + AB\bar{C}$ is :
- (A) $AB + A\bar{C}B$ (B) $A + A\bar{B}C$
(C) $AC + AB\bar{C}$ (D) $B + ABC$
80. In decimal system, the binary number 11011.1101 is :
- (A) $(27.1825)_{10}$
(B) $(27.2581)_{10}$
(C) $(27.2815)_{10}$
(D) $(27.8125)_{10}$



SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SEAL

aglasem

Physica

(53)

PH - 3515 (A 100)