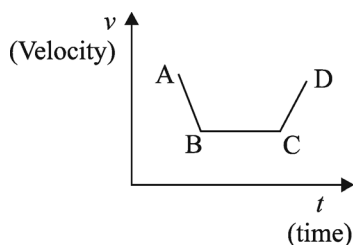


Exercises

- Which one of the following statements regarding lenses is not correct? [NDA-II 2019]
 - A convex lens produces both real and virtual images
 - A concave lens produces both real and virtual images.
 - A convex lens can produce images equal, greater and smaller than the size of the object.
 - A concave lens always produces images smaller than the size of the object.
- Water is heated with a coil of resistance R connected to domestic supply. The rise of temperature of water will depend on [NDA-II 2019]
 - Supply voltage
 - Current passing through the coil.
 - Time for which voltage is supplied.
 Select the correct answer from among the following:
 - 1, 2 and 3
 - 1 and 2 only
 - 1 only
 - 2 and 3 only
- Consider the following part of an electric circuit: The total electrical resistance in the given part of the electric circuit is [NDA-II 2019]

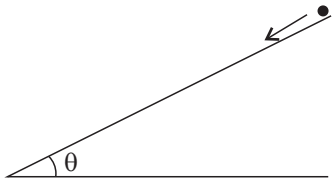
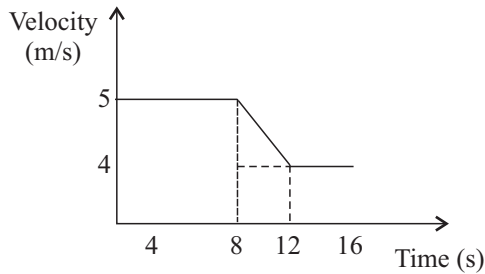
The diagram shows an electrical circuit. On the left, there is a junction where the circuit splits into three parallel branches. The top branch contains a 2Ω resistor, the middle branch contains a 4Ω resistor, and the bottom branch contains an 8Ω resistor. These three branches recombine at a second junction. From this second junction, a single wire leads to a 1Ω resistor, which then continues to the right.

 - $\frac{15}{8}$ ohm
 - $\frac{15}{7}$ ohm
 - 15 ohm
 - $\frac{17}{3}$ ohm
- "The sum of emf's and potential differences around a closed loop equals zero" is a consequence of [NDA-II 2019]
 - Ohm's law.
 - Conservation of charge.
 - Conservation of momentum.
 - Conservation of energy.
- Which one of the following statements regarding Ohm's law is not correct? [NDA-II 2019]
 - Ohm's law is an assumption that current through a conductor is always directly proportional to the potential difference applied to it.
 - A conducting device obeys Ohm's law when the resistance of a device is independent of magnitude and polarity of applied potential difference.
 - A conducting material obeys Ohm's law when the resistance of material is independent of the magnitude and direction of applied electric field
 - All homogeneous materials obey Ohm's law irrespective of whether the field is within range or strong
- Which one of the following statements regarding cathode rays is not correct? [NDA-II 2019]
 - Cathode ray particles are electrons.
 - Cathode ray particles start from anode and move towards cathode.
 - In the absence of electrical and magnetic fields, cathode rays travel in straight lines.
 - Television picture tubes are cathode ray tubes.
- In the given velocity (v) versus time (t) graph, accelerated and decelerated motions are respectively represented by line [NDA-II 2019]
 - Line AB and BC
 - Line BC and CD
 - Line CD and DE
 - Line DE and EF



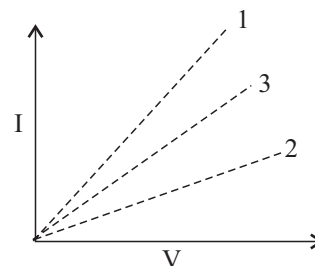
- (a) CD and BC (b) BC and AB
(c) CD and AB (d) AD and CD
8. 1 dyne (a unit of force in CGS system) equals to **[NDA-I 2019]**
(a) 10^3 gcm/s^2 (b) 10^{-3} g cm/s^2
(c) 10^5 kg m/s^2 (d) 10^{-5} kg m/s^2
9. Suppose there are two planets, 1 and 2, having the same density but their radii are R_1 , and R_2 , respectively, where $R_1 > R_2$. The accelerations due to gravity on the surface of these planets are related as **[NDA-I 2019]**
(a) $g_1 > g_2$ (b) $g_1 < g_2$
(c) $g_1 = g_2$ (d) Can't say anything
10. Which one of the following forces is non-central and non-conservative? **[NDA-I 2019]**
(a) Frictional force (b) Electric force
(c) Gravitational force (d) Mechanical force
11. The correct sequence of energy transfer that occurs when an apple falls to the ground is **[NDA-I 2019]**
(a) Gravitational potential energy \rightarrow heat energy to air \rightarrow kinetic energy \rightarrow heat energy to ground and apple \rightarrow sound energy
(b) Gravitational potential energy \rightarrow sound energy \rightarrow kinetic energy-heat energy to air \rightarrow heat energy to ground and apple
(c) Gravitational potential energy \rightarrow kinetic energy \rightarrow heat energy to air heat energy to ground and apple \rightarrow sound energy
(d) Gravitational potential energy \rightarrow kinetic energy \rightarrow sound energy-heat energy to air \rightarrow heat energy to ground and apple
12. Which one of the following energy is stored in the links between the atoms? **[NDA-I 2019]**
(a) Nuclear energy (b) Chemical energy
(c) Potential energy (d) Thermal energy
13. The formula for conversion between Fahrenheit and Celsius is **[NDA-I 2019]**
 $^\circ\text{F} = X + (1.8 \times ^\circ\text{C})$ What is factor X?
(a) 32 (b) 22
(c) 98 (d) 42
14. Which one of the following statements regarding a thermos flask is NOT correct? **[NDA-I 2019]**
(a) The walls of flask are separated by vacuum and made of glass which is a poor conductor of heat
(b) The glass walls themselves have shiny surfaces
(c) The surface of inner wall radiates good amount of heat and the surface of outer wall absorbs some of the heat that is radiated from the inner wall
(d) The cork supports are poor conductors of heat
15. At 20°C , the speed of sound in water is approximately **[NDA-I 2019]**
(a) 330 m/sb (b) 800 m/s
(c) 1500 m/s (d) 5000 m/s
16. LIGO stands for **[NDA-I 2019]**
(a) Laser Interferometer
(b) Light Interferometer Gravitational Wave Observatory
(c) Light Induced Gravity Observatory
(d) Laser Induced Gaseous Optics
17. When a beam of white light passes through a glass prism, the colour of light beam that deviates the least is **[NDA-I 2019]**
(a) Blue (b) Red
(c) Green (d) Violet
18. The Sun is seen little before it rises and for a short while after it sets. This is because of **[NDA-I 2019]**
(a) total internal reflection
(b) atmospheric refraction
(c) apparent shift in the direction of Sun
(d) dispersion
19. The focal length of the objective lens of a telescope is 50 cm. If the magnification of the telescope is 25, then the focal length of the eye-piece is **[NDA-I 2019]**
(a) 12.5 cm (b) 5 cm
(c) 2 cm (d) 10 cm
20. The light energy escaping from the Sun can be spread by **[NDA-I 2019]**
(a) a shower of rain drops
(b) a plane mirror
(c) a convex lens
(d) a combination of a convex lens and a concave lens
21. A fuse wire must be **[NDA-I 2019]**
(a) conducting and of low melting point
(b) conducting and of high melting point
(c) insulator and of high melting point
(d) insulator and of low melting point
22. Consider the following statements about a solenoid : **[NDA-I 2019]**
1. The magnetic field strength in a solenoid depends upon the number of turns per unit length in the solenoid.
2. The magnetic field strength in a solenoid depends upon the current flowing in the wire of the solenoid.

Physics

3. The magnetic field strength in a solenoid depends upon the diameter of the solenoid.
Which of the statements given above are correct?
(a) 1, 2 and 3 (b) 1 and 3 only
(c) 2 and 3 only (d) 1 and 2 only
23. Two metallic wires A and B are made using copper. The radius of wire A is r while its length is l . A dc voltage V is applied across the wire A, causing power dissipation, P . The radius of wire B is $2r$, and its length is $2l$ and the same dc voltage V is applied across it causing power dissipation P_1 . Which one of the following is the correct relationship between P and P_1 ?
[NDA-I 2019]
(a) $P = 2P_1$ (b) $P = 4P_1/2$
(c) $P = P_1/2$ (d) $P = P_1$
24. Let us consider a copper wire having radius r and length l . Let its resistance be R . If the radius of another copper wire is $2r$ and the length is $l/2$ then the resistance of this, wire will be
[NDA-I 2019]
(a) R (b) $2R$
(c) $R/4$ (d) $R/8$
25. Which one of the following can charge an insulator?
[NDA-I 2019]
(a) Current electricity (b) Static electricity
(c) Magnetic (d) Gravitational field
26. Who among the following has explained the phenomenon of photoelectric effect?
(a) Max Planck (b) Albert Einstein
(c) Neils Bohr (d) Ernest Rutherford
27. Basic scientific principle behind a nuclear reactor is
[NDA-I 2019]
(a) Nuclear fusion
(b) Controlled nuclear fusion
(c) Uncontrolled nuclear fission
(d) Controlled nuclear fission
28. Which one of the following statements about the law of conservation of mass is correct? [NDA-II 2018]
(a) A given compound always contains exactly same proportion of elements.
(b) When gases combine in a reaction, they do so in a simple ratio by volume, provided all gases are at room temperature.
(c) Matter can neither be created nor destroyed.
(d) Equal volumes of all gases at same temperature and pressure contain equal number of molecules.
29. Which one of the following is the correct relation between A and nm? [NDA-II 2018]
(a) $1 \text{ nm} = 10^{-1} \text{ A}$ (b) $1 \text{ nm} = 10 \text{ A}$
(c) $1 \text{ nm} = 1 \text{ A}$ (d) $1 \text{ nm} = 10^{-2} \text{ A}$
30. The coefficient of a real expansion of a material is $1.6 \times 10^{-5} \text{ K}^{-1}$. Which one of the following gives the value of coefficient of volume expansion of this material? [NDA-II 2018]
(a) $0.8 \times 10^{-5} \text{ K}^{-1}$ (b) $2.4 \times 10^{-5} \text{ K}^{-1}$
(c) $3.2 \times 10^5 \text{ K}^{-1}$ (d) $4.8 \times 10^{-5} \text{ K}^{-1}$
31. A ball is released from rest and rolls down an inclined-plane, as shown in the following figure, requiring 4s to cover a distance of 100 cm along the plane:
- 
- Which one of the following is the correct value of angle θ that the plane makes with the horizontal? ($g = 1000 \text{ cm/s}^2$) [NDA-II 2018]
(a) $\theta = \sin^{-1}(1/9.8)$ (b) $\theta = \sin^{-1}(1/20)$
(c) $\theta = \sin^{-1}(1/80)$ (d) $\theta = \sin^{-1}(1/100)$
32. Consider the following velocity and time graph:
- 
- Which one of the following is the value of average acceleration from 8 s to 12 s? [NDA-II 2018]
(a) 8 m/s^2 (b) 16 m/s^2
(c) 12 m/s^2 (d) -1 m/s^2
33. A planet has a mass M_1 and radius R_1 . The value of acceleration due to gravity on its surface is g_1 . There is another planet 2, whose mass and radius both are two times that of the first planet. Which one of the following is the acceleration due to gravity on the surface of planet 2? [NDA-II 2018]
(a) g_1 (b) $2g_1$
(c) $g_1/2$ (d) $g_1/4$
34. The absolute, zero temperature is 0 Kelvin. In $^\circ\text{C}$ unit, which one of the following is the absolute zero temperature? [NDA-II 2018]
(a) 0°C (b) -100°C
(c) -273.15°C (d) -173.15°C
35. The time period of oscillation of a simple pendulum having length L and mass of the bob m is given as T . If the length of the pendulum is increased to $4L$ and the mass of the bob is increased to $2m$, then which one of the follow [NDA-II 2018]

- (a) T (b) 2T
(c) 4T (d) T/2
36. The frequency of ultrasound waves is [NDA-II 2018]
(a) less than 20 Hz
(b) between 20 Hz and 2 kHz
(c) between 2 kHz and 20 kHz
(d) greater than 20 kHz
- DIRECTIONS (Qs. 37-38):** The following Two (2) items consist of two statements, Statement I and Statement II. Examine these two statements carefully and select the correct answer using the code given below. [NDA-II 2018]
- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I.
(b) Both the statements are individually true but Statement II is not the correct explanation of Statement I.
(c) Statement I is the true but Statement II is false.
(d) Statement I is false but Statement II is true.
37. **Statement I:** Sound wave cannot propagate in vacuum.
Statement II: Sound waves are elastic waves and require a medium to propagate.
38. **Statement I:** The pitch of the sound wave depends upon its frequency.
Statement II: The loudness of the sound wave depends upon its amplitude.
39. An object is placed in front of a convex mirror. Which one of the following statements is correct? [NDA-II 2018]
(a) It will never form an inverted image.
(b) The image moves towards the focus when the object moves towards the mirror.
(c) Depending on the position of the object with respect to the mirror, the image can be inverted and real.
(d) The size of the image becomes larger than that of the object when the object is placed at a distance equal to half the focal length.
40. Which one of the following statements is correct for a plane mirror? [NDA-II 2018]
(a) Its focal length is zero.
(b) The size of the image of an object placed in front of the mirror is slightly less than that of the object.
(c) The image is virtual, erect and laterally inverted.
(d) Its focal length is 200 cm.
41. The refractive indices of two media, are denoted by n_1 and n_2 , and the velocities of light in these two media are respectively v_1 and v_2 . If n_2/n_1 is 1.5, which one of the following statements is correct? [NDA-II 2018]
(a) v_1 is 1.5 times v_2 (b) v_1 is 1.5 times v_2
(c) v_1 is equal to v_2 (d) v_1 is 3 times v_2

42. If the focal length of a convex lens is 50 cm, which one of the following is its power? [NDA-II 2018]
(a) + 2 dioptre
(b) + 0.02 dioptre
(c) - 0.5 dioptre
(d) + 0.5 dioptre
43. Consider the following statements about a microscope and a telescope [NDA-II 2018]
- Both the eyepiece and the objective of a microscope are convex lenses.
 - The focal length of the objective of a telescope is larger than the focal length of its eyepiece.
 - The magnification of a telescope increases with the increases in focal length of its objective.
 - The magnification of a microscope increases with the increases in focal length of its objective.
- Which of the statements given above are correct?
(a) 1 and 3 only (b) 1 and 4
(c) 2, 3 and 4 (d) 1, 2 and 3
44. A circular coil of radius R having N number of turns carries a steady current I. The magnetic induction at the centre of the coil is 0.1 tesla. If the number of turns is doubled and the radius is halved, which one of the following will be the correct value for the magnetic induction at the centre of the coil? [NDA-II 2018]
(a) 0.05 tesla. (b) 0.2 tesla
(c) 0.4 tesla (d) 0.8 tesla
45. The graphs between current (I) and voltage (V) for three linear resistors 1, 2 and 3 are given below: [NDA-II 2018]



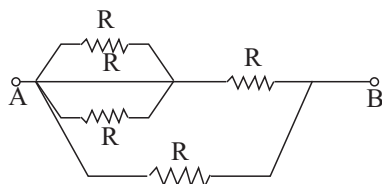
If R_1 , R_2 and R_3 are the resistances of these resistors, then which one of the following is correct?

- [NDA-II 2018]
- (a) $R_1 > R_2 > R_3$
(b) $R_1 < R_3 < R_2$
(c) $R_3 < R_1 < R_2$
(d) $R_3 > R_2 > R_1$
46. The connecting cable of electrical appliances like electric iron, water heater or room heater contains three insulated copper wires of three different colours- red, green and black. Which one of the following is the correct colour code? [NDA-II 2018]

Physics

- (a) Red-live wire, Green-neutral wire, Black-ground wire
 (b) Red-neutral wire, Green-ground wire, Black-live wire
 (c) Red-live wire, Green-ground wire, Black-neutral wire
 (d) Red-ground wire, Green-live wire, Black-neutral wire

47. Consider the following circuit:



Which one of the following is the value of the resistance between points A and B in the circuit given above?

[NDA-II 2018]

- (a) $\frac{2}{5}R$ (b) $\frac{3}{5}R$
 (c) $\frac{3}{2}R$ (d) $4R$

48. If a free electron moves through a potential difference of 1 kV, then the energy gained by the electron is given by

[NDA-II 2018]

- (a) $1.6 \times 10^{-19} \text{ J}$ (b) $1.6 \times 10^{-16} \text{ J}$
 (c) $1 \times 10^{-19} \text{ J}$ (d) $1 \times 10^{-16} \text{ J}$

49. The magnetic field strength of a current-carrying wire at particular distance from the axis of the wire

[NDA-II 2018]

- (a) depends upon the current in the wire
 (b) depends upon the radius of the wire
 (c) depends upon the temperature of the surroundings
 (d) None of the above

50. The wavelength of X-rays is of the order of

[NDA-II 2018]

- (a) 1 Å (b) 1 μm
 (c) 1 mm (d) 1 cm

51. Consider the following statement about visible light, UV light and X-rays:

[NDA-II 2018]

- The wavelength of visible light is more than that of X-rays.
- The energy of X-ray photons is higher than that of UV light photons.
- The energy of UV light photons is less than that of visible light photons.

Which of the statements given above is/are correct?

- (a) 1, 2 and 3 (b) 1 and 2 only
 (c) 2 and 3 only (d) 1 only [NDA-I 2018]

52. Which of the following statements about a fluid at rest in a cup is/are correct? [NDA-I 2018]

- Pressure is same at all the points in the fluid.
- Pressure is exerted on the walls.
- Pressure exists everywhere in the fluid.

Select the correct answer using the code given below:

- (a) 1 and 2 only (b) 2 and 3 only
 (c) 1 only (d) 1, 2 and 3

53. A ball balanced on a vertical rod is an example of

[NDA-I 2018]

- (a) stable equilibrium (b) unstable equilibrium
 (c) neutral equilibrium (d) perfect equilibrium

54. Which one of the following statements about the mass of a body is correct? [NDA-I 2018]

- (a) It changes from one place to another
 (b) It is same everywhere
 (c) It depends on its shape
 (d) It does not depend on its temperature

55. Whether an object will float or sink in a liquid, depends on [NDA-I 2018]

- (a) mass of the object only
 (b) mass of the object and density of liquid only
 (c) difference in the densities of the object and liquid
 (d) mass and shape of the object only

56. Which one of the following statements about gravitational force is NOT correct? [NDA-I 2018]

- (a) It is experienced by all bodies in the universe
 (b) It is a dominant force between celestial bodies
 (c) It is a negligible force for atoms
 (d) It is same for all pairs of bodies in our universe

57. Which one of the following has maximum inertia?

[NDA-I 2018]

- (a) An atom (b) A molecule
 (c) A one-rupee coin (d) A cricket ball

58. An object is moving with uniform acceleration a . Its initial velocity is u and after time t its velocity is v . The equation of its motion is $v = u + at$. The velocity (along y -axis) time (along x -axis) graph shall be a straight line [NDA-I 2018]

- (a) passing through origin
 (b) with x -intercept u
 (c) with y -intercept u
 (d) with slope u

59. If an object moves with constant velocity then which one of the following statements is NOT correct? [NDA-I 2018]

- (a) Its motion is along a straight line
 (b) Its speed changes with time
 (c) Its acceleration is zero
 (d) its displacement increases linearly with time

60. Thermal capacity of a body depends on the [NDA-I 2018]
- mass of the body only
 - mass and shape of the body only
 - density of the body
 - mass, shape and temperature of the body
61. Which of the following statements about specific heat of a body is/are correct? [NDA-I 2018]
- It depends upon mass and shape of the body
 - It is independent of mass and shape of the body
 - It depends only upon the temperature of the body
- Select the correct answer using the code given below:
- 1 only
 - 2 and 3
 - 1 and 3
 - 2 only
62. Which of the following statements about latent heat for a given substance is/are correct? [NDA-I 2018]
- It is fixed at a given temperature.
 - It depends upon the temperature and volume.
 - It is independent of temperature and volume.
 - It depends on the temperature but independent of volume.
- Select the correct answer using the code given below:
- 2 only
 - 1 and 3
 - 4 only
 - 1 and 4
63. Which one of the following is the value of 1 kWh of energy converted into joules? [NDA-I 2018]
- 1.8×10^6 J
 - 3.6×10^6 J
 - 6.0×10^6 J
 - 7.2×10^6 J
64. Which one of the following statements is correct? [NDA-I 2018]
- Any energy transfer that does not involve temperature difference in some way is not heat
 - Any energy transfer always requires a temperature difference
 - On heating the length and volume of the object remain exactly the same
 - Whenever there is a temperature difference, heat is the only way of energy transfer.
65. Which of the following statements about electromagnetic waves, sound waves and water waves is/are correct? [NDA-I 2018]
- They exhibit reflection
 - They carry energy
 - They exert pressure
 - They can travel in vacuum
- Select the correct answer using the code given below:
- 1, 2 and 3
 - 2 and 4
 - 1 and 3 only
 - 1 only
66. Which one of the following is an example of the force of gravity of the earth acting on a vibrating pendulum bob? [NDA-I 2018]
- Applied force
 - Frictional force
 - Restoring force
 - Virtual force
67. Which one of the following frequency ranges is sensitive to human ears? [NDA-I 2018]
- 0-200 Hz
 - 20-20,000 Hz
 - 200-20,000 Hz only
 - 2,000-20,000 Hz only
68. If T is the time period of an oscillating pendulum, which one of the following statements is NOT correct? [NDA-I 2018]
- The motions repeats after time T only once
 - T is the least time after which motion repeats itself
 - The motion repeats itself after nT , where n is a positive integer
 - T remains the same only for small angular displacements
69. Two convex lenses with power 2 dioptre are kept in contact with each other. The focal length of the combined lens system is [NDA-I 2018]
- 0.10 m
 - 2 m
 - 4 m
 - 0.25 m
70. Which one of the following statements about the refractive index of a material medium with respect to air is correct? [NDA-I 2018]
- It can be either positive or negative
 - It can have zero value
 - It is unity for all materials
 - It is always greater than one
71. Which one of the following is the natural phenomenon based on which a simple periscope works? [NDA-I 2018]
- Reflection of light
 - Refraction of light
 - Dispersion of light
 - Total internal reflection of light
72. Which one of the following statements about magnetic field lines is NOT correct? [NDA-I 2018]
- They can emanate from a point
 - They do not cross each other
 - Field lines between two poles cannot be precisely straight lines at the ends
 - There are no field lines within a bar magnet current carrying wire at

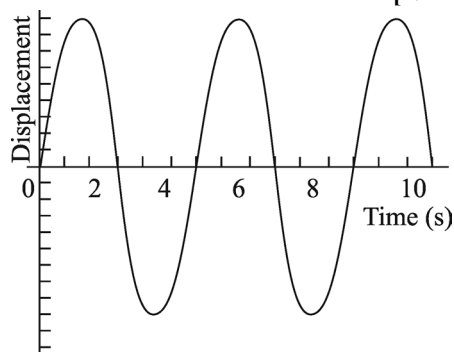
Physics

73. Which one of the following devices is non-ohmic?
[NDA-I 2018]
- (a) Conducting copper coil
(b) Electric heating coil
(c) Semi conductor diode
(d) Rheostat
74. What is the net force experienced by a bar magnet placed in a uniform magnetic field? [NDA-I 2018]
- (a) Zero
(b) Depends upon length of the magnet
(c) Never zero
(d) Depends upon temperature
75. Who among the following built a model steam engine in 1698 called "Miner's Friend" to drain mines?
[NDA-I 2018]
- (a) Thomas Savery (b) Thomas Newcomen
(c) James Watts to cup (d) Richard Arkwright
76. Which one of the following statements about energy is correct?
[NDA-II 2017]
- (a) Energy can be created as well as destroyed.
(b) Energy can be created but not destroyed.
(c) Energy can neither be created nor destroyed.
(d) Energy cannot be created but can be destroyed
77. If some object is weighed when submerged in water, what will happen to its weight compared to its weight in air?
[NDA-II 2017]
- (a) Increase
(b) Decrease
(c) Remain exactly the same
(d) Increase or decrease cannot be predicted
78. In a vacuum, a five-rupee coin, a feather of a sparrow bird and a mango are dropped simultaneously from the same height. The time taken by them to reach the bottom is t_1 , t_2 respectively. In this situation, we will observe that [NDA-II 2017]
- (a) $t_1 > t_2 > t_3$ (b) $t_1 > t_3 > t_2$
(c) $t_3 > t_1 > t_2$ (d) $t_1 = t_2 = t_3$
79. The force acting on a particle of mass m moving along the x -axis is given by $F(x) = Ax^2 - Bx$. Which one of the following is the potential energy of the particle?
[NDA-II 2017]
- (a) $2Ax - B$ (b) $\frac{x^2}{6}(2Ax - B)$
(c) $Ax^3 - Bx^2$ (d) Zero
80. An object moves in a circular path with a constant speed. Which one of the following statements is correct?
[NDA-II 2017]
- (a) The centripetal acceleration of the object is smaller for a gentle curve (i.e., curve of larger radius) than that for a sharp curve (i.e., curve of smaller radius).
(b) The centripetal acceleration is greater for a gentle curve than that for a sharp curve.
(c) The centripetal acceleration is the same for both, the gentle and sharp curves.
(d) The centripetal acceleration causes the object to slow down.
81. The statement that 'heat cannot flow by itself from a body at a lower temperature to a body at a higher temperature', is known as [NDA-II 2017]
- (a) Zeroth law of thermodynamics
(b) First law of thermodynamics
(c) Second law of thermodynamics
(d) Third law of thermodynamics
82. Water boils at a lower temperature at high altitudes, because [NDA-II 2017]
- (a) the air pressure is less
(b) outside temperature is less
(c) latest heat is less
(d) None of the above
83. Which one of the following statements is not correct?
[NDA-II 2017]
- (a) Ultrasonic waves cannot get reflected, refracted or vishem absorbed.
(b) Ultrasonic waves are used to detect the presence of defects like cracks, porosity, etc. in the internal structure of common structure materials.
(c) Ultrasonic waves can be used for making holes in very hard materials like diamond.
(d) Ultrasonic waves cannot travel through vacuum.
84. Bats detect obstacles in their path by receiving the reflected [NDA-II 2017]
- (a) Infrasonic waves
(b) Ultrasonic waves
(c) Radio waves
(d) Microwaves
85. Which one among the following waves carries the maximum energy per photon? [NDA-II 2017]
- (a) X-rays (b) Radio waves
(c) Light waves (d) Microwaves
86. Concave mirror is used in headlights of vehicles, because it [NDA-II 2017]
- (a) focuses light from the bulb onto nearby vehicles
(b) sends parallel rays
(c) fits well into the shape of the headlight
(d) is cheaper than other mirrors
87. The mirrors used as rear-view mirrors in vehicles are [NDA-II 2017]
- (a) concave (b) convex
(c) cylindrical (d) plane

88. Step-up transformers are used for [NDA-II 2017]
 (a) increasing electrical power
 (b) decreasing electrical power
 (c) decreasing voltage
 (d) increasing voltage
89. The majority charge carriers in a *p*-type semiconductor [NDA-II 2017]
 (a) free electrons (b) conduction electrons
 (c) ions-free electrons (d) holes
90. The symbol of SI unit of inductance is H. It stands for [NDA-II 2017]
 (a) Holm (b) Halogen
 (c) Henry (d) Hertz
91. Which one of the following waves is used for detecting mail forgery in currency notes? [NDA-II 2017]
 (a) Ultraviolet waves (b) Infrared waves
 (c) Radio waves (d) Microwaves
92. Radioactivity is measured by [NDA-II 2017]
 (a) GM Counter (b) Polarimeter
 (c) Calorimeter (d) Colorimeter
93. Electron emission from a metallic surface by application of light is known as [NDA-II 2017]
 (a) Thermionic emission.
 (b) Photoelectric emission
 (c) High field emission.
 (d) Autoelectronic emission
94. Why is it difficult to measure the coefficient of expansion of a liquid than solid? [NDA-II 2017]
 (a) Liquids tend to evaporate at all temperatures
 (b) Liquids conduct more heat
 (c) Liquids expand too much when heated
 (d) Their containers also expand when heated
95. Which one of the following statements is true for the relation $F = \frac{Gm_1m_2}{r^2}$? (All symbols have their usual meanings) [NDA-II 2017]
 (a) The quantity *G* depends on the local value of *g*, acceleration due to gravity
 (b) The quantity *G* is greatest at the surface of the Earth
 (c) The quantity *G* is used only when earth is one of the two masses
 (d) The quantity *G* is a universal constant
96. Which one of the following physical quantity has the same unit as that of pressure? [NDA-I 2017]
 (a) Angular momentum (b) Stress
 (c) Strain (d) Work
97. The time period of a simple pendulum made using a thin copper wire of length *L* is *T*. Suppose the temperature of the room in which this simple pendulum is placed increases by 30°C, what will be the effect on the time period of the pendulum? [NDA-I 2017]

- (a) *T* will increase slightly
 (b) *T* will remain the same
 (c) *T* will decrease slightly
 (d) *T* will become more than 2 times

98. The following figure shows displacement versus time curve for a particle executing simple harmonic motion [NDA-I 2017]



Which one of the following statements is correct?

- (a) Phase of the oscillating particle is same at $t = 1$ s and $t = 3$ s
 (b) Phase of the oscillating particle is same at $t = 4$ s and $t = 10$ s
 (c) Phase of the oscillating particle is same at $t = 3$ s and $t = 7$ s
 (d) Phase of the oscillating particle is same at $t = 2$ s and $t = 8$ s
99. The speed of a car travelling on a straight road is listed below at successive intervals of 1 s : [NDA-I 2017]
- | Time (s) | 0 | 1 | 2 | 3 | 4 |
|-------------|---|---|---|---|---|
| Speed (m/s) | 0 | 2 | 4 | 6 | 8 |
- Which of the following is/are correct ?
 The Car travelled
- with a uniform acceleration of 2 m/s^2
 - 16 m in 4 s.
 - with an average speed of 4 m/s.
- Select the correct answer using the code given below
 (a) 1, 2 and 3 (b) 2 and 3 only
 (c) 1 and 2 only (d) 1 only
100. A Kelvin thermometer and a Fahrenheit thermometer both give the same reading for a certain sample. What would be the corresponding reading in a Celsius thermometer? [NDA-I 2017]
 (a) 574 (b) 314
 (c) 273 (d) 232
101. The amount of heat required to change a liquid to gaseous state without any change in temperature is known as [NDA-I 2017]
 (a) specific heat capacity
 (b) mechanical equivalent of heat
 (c) latent heat of vaporization
 (d) quenching

Physics

102. Which one of the following statements is NOT correct?
[NDA-I 2017]
- In the conduction mode of transference of heat, the molecules of solid pass heat from one molecule to another without moving from their positions
 - The amount of heat required to raise the temperature of a substance is called its specific heat capacity
 - The process of heat transfer in liquids and gases is through convection mode
 - The process of heat transfer from a body at higher temperature to a body at lower temperature without in heating the space between them is known as radiation
103. Which one of the following is the correct relation between frequency f and angular frequency ω ?
[NDA-I 2017]
- $f = \pi\omega$
 - $\omega = 2\pi f$
 - $f = 2\omega/\pi$
 - $f = 2\pi\omega$
104. The speed of a body that has Mach number more than 1 is
[NDA-I 2017]
- supersonic
 - subsonic
 - 300 m/s
 - about 10 m/s
105. If the absolute refractive indices of glass and water are $3/2$ and $4/3$ respectively, what will be the ratio of velocity of light in glass and water?
[NDA-I 2017]
- 3 : 4
 - 4 : 3
 - 8 : 7
 - 8 : 9
106. The radii of curvature of the faces of a double convex lens are 10 cm and 20 cm. The refractive index of the glass is 1.5. What is the power of this lens (in units of dioptre)?
[NDA-I 2017]
- + 7.5 D
 - 7.5 D
 - + 2.5 D
 - + 5.0 D
107. Which one of the following statements is correct about the magnification of an optical microscope?
[NDA-I 2017]
- Magnification increases with the increase in focal length of eyepiece
 - Magnification increases with the increase in focal length of objective
 - Magnification does not depend upon the focal length of eyepiece
 - Magnification decreases with the increase in focal length of eyepiece
108. Match List I with List II and select the correct answer using the code given below the Lists : [NDA-I 2017]
- | List I
(Disease) | List II
(Remedy) |
|---------------------|---------------------|
| A. Hypermetropia | 1. Concave lens |
| B. Presbyopia | 2. Bifocal lens |
- C. Myopia
D. Cataract
- Surgery
 - Convex lens
- Codes:**
- | A | B | C | D | A | B | C | D |
|-------|---|---|---|-------|---|---|---|
| (a) 4 | 2 | 1 | 3 | (b) 4 | 1 | 2 | 3 |
| (c) 3 | 1 | 2 | 4 | (d) 3 | 2 | 1 | 4 |
109. An optical illusion which occurs mainly in deserts during hot summer is based on the principle of
[NDA-I 2017]
- Reflection
 - Interference
 - Dispersion
 - Total internal reflection
110. A positive charge $+q$ is placed at the centre of a hollow metallic sphere of inner radius a and outer radius b . The electric field at a distance r from the centre is denoted by E . In this regard, which one of the following statements is correct?
[NDA-I 2017]
- $E = 0$ for $a < r < b$
 - $E = 0$ for $r < a$
 - $E = q/4\pi\epsilon_0$ for $a < r < b$
 - $E = q/4\pi\epsilon_0$ for $r < a$
111. If the potential difference applied to an X-ray tube is doubled while keeping the separation between the filament and the target as same, what will happen to the cutoff wavelength?
[NDA-I 2017]
- Will remain same
 - Will be doubled
 - Will be halved
 - Will be four times of the original wavelength
112. Suppose a rod is given a negative charge by rubbing it with wool. Which one of the following statements is correct in this case?
[NDA-I 2017]
- The positive charges are transferred from rod to wool
 - The positive charges are transferred from wool to rod
 - The negative charges are transferred from rod to wool
 - The negative charges are transferred from wool to rod
113. Which one of the following physical quantities does NOT affect the resistance of a cylindrical resistor?
[NDA-I 2017]
- The current through it
 - Its length
 - The resistivity of the material used in the resistor
 - The area of cross-section of the cylinder

114. Which one of the following statements is correct with regard to the material of electrical insulators?

[NDA-I 2017]

- (a) They contain no electrons
- (b) Electrons do not flow easily through them
- (c) They are crystals
- (d) They have more number of electrons than the protons on their surface

115. In a solenoid, the current flowing through the wire is I and number of turns per unit length is n . This gives a magnetic field B inside the solenoid. If number of turn per unit length is increased to $2n$, what will be the value of magnetic field in the solenoid? [NDA-I 2017]

- (a) B
- (b) $2B$
- (c) $B/2$
- (d) $B/4$

116. A circular coil of single turn has a resistance of 20Ω . Which one of the following is the correct value for the resistance between the ends of any diameter of the coil? [NDA-I 2017]

- (a) 5Ω
- (b) 10Ω
- (c) 20Ω
- (d) 40Ω

117. At which place Earth's magnetic field becomes horizontal? [NDA-I 2017]

- (a) Magnetic meridian
- (b) Magnetic equator
- (c) Geographical pole
- (d) Tropic of Cancer

118. Which one of the following devices changes low voltage alternating current to high voltage alternating current and vice versa? [NDA-I 2017]

- (a) Generator
- (b) Motor
- (c) Transformer
- (d) Vibrator

119. The S.I. unit of acceleration is [NDA-I 2016]

- (a) ms^{-1}
- (b) ms^{-2}
- (c) cms^{-2}
- (d) kms^{-2}

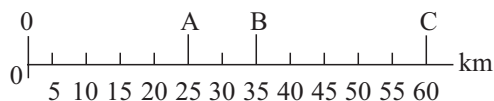
120. Density of water is [NDA-I 2016]

- (a) maximum at 0°C
- (b) minimum at 0°C
- (c) maximum at 4°C
- (d) minimum at -4°C

121. A container is first filled with water and then the entire water is replaced by mercury. Mercury has a density of $13.6 \times 10^3 \text{ kg/m}^3$. If X is the weight of the water and Y is the weight of the mercury, then [NDA-I 2016]

- (a) $X = Y$
- (b) $X = 13.6Y$
- (c) $Y = 13.6X$
- (d) None of the above

122. The motion of a car along a straight path is shown by the following figures : [NDA-I 2016]



The car starts 0 and reaches at A, B and C at different instants of time. During its motion from 0 to C and back to B, the distance covered and displacement are, respectively.

- (a) 25 km and 60 km
- (b) 95 km and 35 km
- (c) 60 km and 25 km
- (d) 85 km and 35 km

123. The impulse on a particle due to a force acting on it during a given time interval is equal to the change in its [NDA-I 2016]

- (a) force
- (b) momentum
- (c) work done
- (d) energy

124. A man weighing 70 kg is coming down in a lift. If the cable of the lift breaks suddenly, the weight of the man would become [NDA-I 2016]

- (a) 70 kg
- (b) 35 kg
- (c) 140 kg
- (d) zero

125. A racing car accelerates on a straight road from rest to a speed of 50 m/s in 25 s. Assuming uniform acceleration of the car throughout, the distance covered in this time will be [NDA-I 2016]

- (a) 625 m
- (b) 250 m
- (c) 2500 m
- (d) 50 m

126. A glass vessel is filled with water to the rim and a lid is fixed to it tightly. Then it is left inside a freezer for hours. What is expected to happen? [NDA-I 2016]

- (a) The water freezes to ice and the level of ice comes down
- (b) The water in the glass vessel simply freezes to ice
- (c) The glass vessel breaks due to expansion as water freezes to ice
- (d) The water does not freeze at all

127. Two bodies A and B are moving with equal velocities. The mass of B is double that of a . In this context, which one of the following statements is correct? [NDA-I 2016]

- (a) Momentum of B will be double that of A
- (b) Momentum of A will be double that of B
- (c) Momentum of B will be four times that of A
- (d) Momenta of both A and B will be equal.

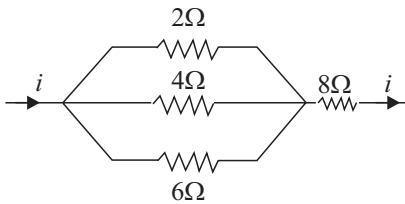
128. Mass of a particular amount of substance [NDA-I 2016]

1. is the amount of matter present in it.
2. does not vary from place to place
3. changes with changes in gravitational force.

Select the correct answer using the code given below

- (a) 1, 2 and 3
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1 only

Physics

129. A body has a free fall from a height of 20 m. After falling through a distance of 5 m, the body would
[NDA-I 2016]
- lose one-fourth of its total energy
 - lose one-fourth of its potential energy
 - gain one-fourth of its total energy
 - gain three-fourth of its total energy
130. Suppose the force of gravitation between two bodies of equal masses is F . If each mass is doubled keeping the distance of separation between them unchanged, the force would become
[NDA-I 2016]
- F
 - $2F$
 - $4F$
 - $\frac{1}{4}F$
131. Which one of the following statements with regard to expansion of materials due to heating is not correct?
[NDA-I 2016]
- As ice melts, it expands uniformly up to 4°C .
 - Mercury thermometer works using the principle of expansion due to heating.
 - Small gap is kept between two rails to allow for expansion due to heating.
 - The length of metallic wire increases when its temperature is increased.
132. The temperature at which a solid melts to become a liquid at the atmospheric pressure is called its melting point. The melting point of a solid is an indication of
[NDA-I 2016]
- strength of the intermolecular forces of attraction
 - strength of the intermolecular forces of repulsion
 - molecular mass
 - molecular size
133. When a solid is heated, it turns directly into a gas. This process is called
[NDA-I 2016]
- Condensation
 - Evaporation
 - Sublimation
 - Diffusion
134. The brightness of a star depends on its
[NDA-I 2016]
- size and temperature only
 - size and distance from the earth
 - size, temperature and mass
 - size, temperature and distance from the earth
135. A lady is standing in front of a plane mirror at a distance of 1 m from it. She walks 60 cm towards the mirror. The distance of her image now from herself (ignoring the thickness of the mirror) is
[NDA-I 2016]
- 40 cm
 - 60 cm
 - 80 cm
 - 120 cm
136. A pencil is placed upright at a distance of 10 cm from a convex lens of focal length 15 cm.
The nature of the image of the pencil will be
[NDA-I 2016]
- real, inverted and magnified
 - real, erect and magnified
 - virtual, erect and reduced
 - virtual, erect and magnified
137. An object is placed at the centre of curvature of a concave mirror of focal length 16 cm. If the object is shifted by 8 cm towards the focus, the nature of the image would be
[NDA-I 2016]
- real and magnified
 - virtual and magnified
 - real and reduced
 - virtual and reduced
138. A given conductor carrying a current of 1 A produces an amount of heat equal to 2000 J. If the current through the conductor is doubled, the amount of heat produced will be
[NDA-I 2016]
- 2000 J
 - 4000 J
 - 8000 J
 - 1000 J
139. Consider the following circuit:
- 
- The equivalent resistance of the circuit will be
[NDA-I 2016]
- $12\ \Omega$
 - $8\frac{11}{12}\ \Omega$
 - $90\frac{1}{11}\ \Omega$
 - $\frac{24}{25}\ \Omega$
140. Three resistors with magnitudes 2, 4 and 8 ohm are connected in parallel. The equivalent resistance of the system would be
[NDA-I 2016]
- less than 2 ohm
 - more than 2 ohm but less than 4 ohm
 - 4 ohm
 - 14 ohm
141. A simple circuit contains a 12 V battery and a bulb having 24 ohm resistance. When you turn on the switch, the ammeter connected in the circuit would read
[NDA-I 2016]
- 0.5 A
 - 2 A
 - 4 A
 - 5 A

142. Which one of the following is not a form of stored energy? [NDA-I 2016]

- (a) Nuclear energy (b) Potential energy
(c) Electrical energy (d) Chemical energy

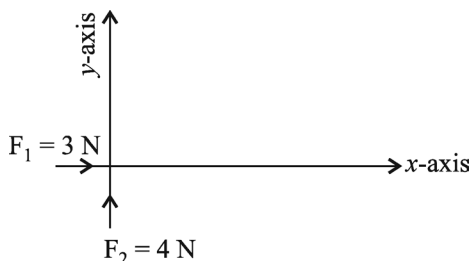
143. The acceleration due to gravity 'g' for objects on or near the surface of earth is related to the universal gravitational constant 'G' as ('M' is the mass of the earth and 'R' is its radius): [NDA-II 2015]

- (a) $G = g \frac{M}{R^2}$ (b) $g = G \frac{M}{R^2}$
(c) $M = \frac{gG}{R^2}$ (d) $R = \frac{gG}{M^2}$

144. In SI unit of force 'Newton' (N) is given by (where *m* stands for metre and *S* stands for second): [NDA-II 2015]

- (a) 1 N = 1 kg/ms²
(b) 1 N = 1 kgm/s²
(c) 1 N = 1 kg s²/m
(d) 1 N = 1 kg ms²

145. Two forces, one of 3 newton and another of 4 newton are applied on a standard 1 kg body, placed on a horizontal and frictionless surface, simultaneously along the x-axis and the y-axis, respectively, as shown below: [NDA-II 2015]



The magnitude of the resultant acceleration is:

- (a) 7 m/s² (b) 1 m/s²
(c) 5 m/s² (d) 7 m/s²

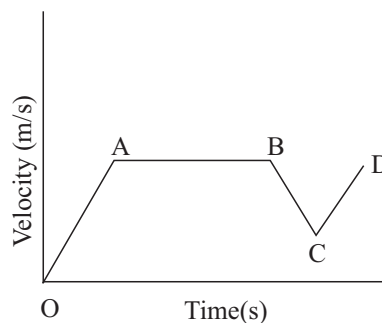
146. Conservation of momentum in a collision between particles can be understood on the basis of: [NDA-II 2015]

- (a) Newton's first law of motion
(b) Newton's second law of motion
(c) Both Newton's second law of motion and Newton's third law of motion
(d) Conservation of energy

147. A man is sitting in a train which is moving with a velocity of 60 km/hour. His speed with respect to the train is: [NDA-II 2015]

- (a) 10/3 m/s (b) 60 m/s
(c) infinite (d) zero

148. The following figure represents the velocity-time graph of a moving car on a road: [NDA-II 2015]



Which segment of the graph represents the retardation?

- (a) AB (b) BC
(c) CD (d) None of these

149. Which one of the following statements is not correct? [NDA-II 2015]

- (a) If the velocity and acceleration have opposite sign, the object is slowing down
(b) If the velocity is zero at an instant, the acceleration should also be zero at that instant
(c) If the velocity is zero for a time interval; the acceleration is zero at any instant within the time interval
(d) If the position and velocity have opposite sign, the object is moving towards the origin

150. A brass ball is tied to a thin wire and swung so as to move uniformly in a horizontal circle. Which of the following statements in this regard is/are true? [NDA-II 2015]

1. The ball moves with constant velocity
2. The ball moves with constant speed
3. The ball moves with constant acceleration
4. The magnitude of the acceleration of the ball is constant

Select the correct answer using the code given below:

- (a) 1 only (b) 1 and 3
(c) 1, 2 and 4 (d) 2 and 4

151. Which one of the following statements is not correct? [NDA-II 2015]

- (a) Conduction can occur easily in solids, less easily in liquids but hardly at all in gases
(b) Heat energy is carried by moving particles in a convection current
(c) Heat energy is carried by electromagnetic waves in radiation
(d) The temperature at which a solid changes into a liquid is called the boiling point

152. Which one of the following is the SI unit of the thermal conductivity of a material? [NDA-II 2015]

- (a) Wm⁻¹K⁻¹ (b) Wm/K
(c) Wm⁻¹/K⁻¹ (d) Js¹m¹K

Physics

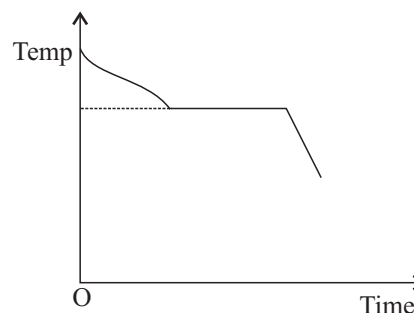
153. Which one of the following statements is not correct?
[NDA-II 2015]
- The Kelvin scale of temperature is called the absolute scale
 - Visible light radiation has wavelength range of 400-700 nm
 - The capacity to do work is called power
 - The wavelength of Gamma rays is less than that of X-rays
154. The silvering in thermos flasks is done to avoid heat transfer by:
[NDA-II 2015]
- Convection
 - Conduction
 - Radiation
 - Both convection and conduction
155. Which one of the following statements is not correct?
[NDA-II 2015]
- In steady flow of a liquid, the velocity of liquid particles reaching at a particular point is the same at all points
 - Steady flow is also called streamlined flow
 - In steady flow, each particle may not follow the same path as taken by a previous particle passing through that point
 - Two streamlines cannot intersect each other
156. The loudness of sound is related to: [NDA-II 2015]
- its frequency
 - its amplitude
 - its speed
 - its pitch
157. Which one of the following statements is correct?
[NDA-II 2015]
- The image formed by a concave mirror for an object lying at infinity is at the principal focus, highly diminished, real and inverted
 - A ray of light parallel to the principal axis after reflection from a concave mirror appears to diverge from the principal focus of the mirror
 - The focal length of a spherical mirror is double of its radius of curvature
 - A ray of light travelling from a rarer medium to a denser medium bends away from the normal
158. Which one of the following statements is not correct?
[NDA-II 2015]
- The radius of curvature of a concave mirror is twice its focal length
 - Power of a convex lens is negative and that of a concave lens is positive
 - The radius of curvature of a plane mirror is infinity
 - When a ray of light passes from an optically denser medium to an optically rarer medium, the angle of refraction is greater than the corresponding angle of incidence
159. In case of a compound microscope which of the following statements is/are correct? [NDA-II 2015]
- The focal length of the eye piece is larger than the focal length of the objective
 - The focal length of the eye piece is smaller than the focal length of the objective
 - The image produced in a normal optical microscope is real
 - The image produced in a normal optical microscope is virtual
- Select the correct answer using the code given below:
- 1 only
 - 1 and 4
 - 2 and 3
 - 2 and 4
160. Magnetic meridian is an imaginary [NDA-II 2015]
- line along north-south
 - point
 - vertical plane
 - horizontal plane
161. The resistance of a wire of length l and area of cross-section a is x ohm. If the wire is stretched to double its length, its resistance would become: [NDA-II 2015]
- $2x$ ohm
 - $0.5x$ ohm
 - $4x$ ohm
 - $6x$ ohm
162. Which of the following are the properties of an electron? [NDA-II 2015]
- Electron is a constituent of cathode ray
 - Electron is a negatively charged particle
 - The mass of the electron is equal to the mass of the proton
 - Electron is deflected by the electric field but not by magnetic field
- Select the correct answer using the code given below:
- 1 and 2 only
 - 1, 2 and 3
 - 3 and 4
 - 1 and 4
163. Three equal resistances when combined in series are equivalent to 90 ohm. Their equivalent resistance when combined in parallel will be: [NDA-II 2015]
- 10 ohm
 - 30 ohm
 - 270 ohm
 - 810 ohm
164. Two long wires each carrying a d.c. current in the same direction are placed close to each other. Which one of the following statements is correct? [NDA-II 2015]
- The wires will attract each other
 - The wires will repel each other
 - There will be no force between the wires
 - There will be a force between the wires only at the moment when the current is switched ON or OFF

165. X-rays are electromagnetic radiation whose wavelengths are of the order of: [NDA-I 2015]
 (a) 1 metre (b) 10^{-1} metre
 (c) 10^{-5} metre (d) 10^{-10} metre
166. Which one among the following does not wet the walls of the glass vessel in which it is kept? [NDA-I 2015]
 (a) Watery lain (b) Alcohol
 (c) Mercury (d) Phenol
167. **Statement I:** While putting clothes for drying up, we spread them out. [NDA-I 2015]
Statement II: The rate of evaporation increases with an increase in surface area.
 (a) Both the statements are individually true and Statement II is the correct explanation of Statement I
 (b) Both the statements are individually true but Statement II is not the correct explanation of Statement I
 (c) Statement I is true but Statement II is false
 (d) Statement I is true but Statement II is true
168. A deep sea diver may hurt his ear drum during diving because of [NDA-I 2015]
 (a) lack of oxygen
 (b) high atmospheric pressure
 (c) high water pressure
 (d) All of these
169. A person stands on his two feet over a surface and experiences a pressure P. Now the person stands on only one foot. He would experience a pressure of magnitude [NDA-I 2015]
 (a) 4P (b) P
 (c) $\frac{1}{2}$ P (d) 2 P
170. Which one of the following is not a result of surface tension? [NDA-I 2015]
 (a) Nearly spherical drop of rain
 (b) Capillary rise
 (c) Removal of dirt by soap or detergent
 (d) Flow of a liquid
171. The displacement-time graph of a particle acted upon by a constant force is [NDA-I 2015]
 (a) a straight line
 (b) a circle
 (c) a parabola
 (d) any curve depending upon initial conditions
172. If radius of the earth were to shrink by 1%, its mass remaining the same, g would decrease by nearly [NDA-I 2015]
 (a) 1% (b) 2%
 (c) 3% (d) 4%

DIRECTION (Q. 173): The following item consist of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these items using the code given below: [NDA-I 2015]

Code:

- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I.
 (b) Both the statements are individually true but Statement II is not the correct explanation of Statement I.
 (c) Statement I is true but Statement II is false.
 (d) Statement I is true but Statement II is true.
173. **Statement I:** A body weighs less on a hill top than on earth's surface even though its mass remains unchanged. [NDA-I 2015]
Statement II: The acceleration due to gravity of the earth decreases with height.
174. The absolute zero, i.e., temperature below which is not achievable, is about:
 (a) 0°C (b) -273 K
 (c) -273°C (d) -300°C
175. Thermal conductivity of aluminium, copper and stainless steel increases in the order [NDA-I 2015]
 (a) Copper < Aluminium < Stainless Steel
 (b) Stainless Steel < Aluminium < Copper
 (c) Aluminium < Copper < Stainless Steel
 (d) Copper < Stainless Steel < Aluminium
176. A solid is melted and allowed to cool and solidify again. The temperature is measured at equal intervals of time. The graph below shows the change of temperature with time. [NDA-I 2015]



The part of the curve that is practically horizontal due to

- (a) latent heat given away by the liquid
 (b) specific heat given away by the liquid
 (c) thermal capacity changes with time keeping temperature constant
 (d) change in density during transformation
177. A spring can be used to determine the mass m of an object in two ways: [NDA-I 2015]
 (i) by measuring the extension x in the spring due to the object; and

189. If a charged particle (+ q) is projected with certain velocity parallel to the magnetic field, then it will

[NDA-I 2015]

- (a) trace helical path
- (b) trace circular path
- (c) continue its motion without any change
- (d) come to rest instantly

190. The dimension of 'impulse' is the same as that of

[NDA-II 2014]

- (a) pressure
- (b) angular momentum
- (c) work
- (d) linear momentum

191. Kerosene oil rises in a wick of lantern because of

[NDA-II 2014]

- (a) buoyancy of air
- (b) diffusion of the oil through the wick
- (c) capillary action in the wick
- (d) gravitational pull of the wick

192. A particle is moving with uniform acceleration along a straight line ABC, where $AB = BC$. The average velocity of the particle from A to B is 10 m/s and from B to C is 15 m/s. The average velocity for the whole journey from A to C in m/s is

[NDA-II 2014]

- (a) 12
- (b) 12.5 D
- (c) 13
- (d) 13.5

193. The densities of three liquids are D , $2D$ and $3D$. What will be the density of the resulting mixture if equal volumes of the three liquids are mixed?

[NDA-II 2014]

- (a) $6D$
- (b) $1.4D$
- (c) $2D$
- (d) $3D$

194. A bullet is fired vertically up from a 400 m tall tower with a speed 80 m/s. If g is taken as 10 m/s^2 , the time taken by the bullet to reach the ground will be

[NDA-II 2014]

- (a) 8 s
- (b) 16 s
- (c) 20 s
- (d) 24 s

195. If the length of the Equator is about 40000 km and the velocity of rotation is about 1700 km per hour, what would be the velocity of rotation at the Pole?

[NDA-II 2014]

- (a) Zero
- (b) 850 km/hr
- (c) 1700 km/hr
- (d) 3400 km/hr

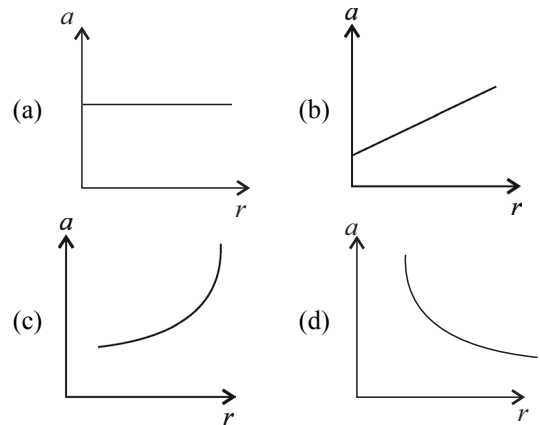
196. Two cars A and B have masses m_A and m_B respectively, with $m_A > m_B$. Both the cars are moving in the same direction with equal kinetic energy. If equal braking force is applied on both, then before coming to rest

[NDA-II 2014]

- (a) A will cover a greater distance
- (b) B will cover a greater distance

- (c) both will cover the same distance
- (d) distance covered by them will depend on their respective velocities

197. A particle is moving in a circular path of radius r at a constant speed v . Which one of the following graphs correctly represents its acceleration a ? [NDA-II 2014]



198. A force applied on a body is represented as $\vec{F} = 6\hat{i} + 8\hat{j} + 10\hat{k}$ and accelerates it at 1 m/s^2 . The mass of the body is

[NDA-II 2014]

- (a) 10 kg
- (b) $10\sqrt{2}$ kg
- (c) $2\sqrt{10}$ kg
- (d) 8 kg

199. Two bodies A and B having masses m and $4m$ respectively are moving with equal linear momentum. The ratio of kinetic energies between A and B is

[NDA-II 2014]

- (a) 1 : 4
- (b) 4 : 1
- (c) 1 : 1
- (d) 1 : 2

200. A force \vec{F} acting on an electric charge q , in presence of an electromagnetic field, moves the charge parallel to the magnetic field with velocity \vec{v} . The \vec{F} is equal to (where \vec{E} and \vec{B} are electric field and magnetic field respectively)

[NDA-II 2014]

- (a) $q\vec{E}$
- (b) $q(\vec{v} \times \vec{B})$
- (c) $q(\vec{v} \times \vec{E})$
- (d) $q\vec{B}$

201. If the motion of an object is represented by a straight line parallel to the time axis in a distance-time graph, then the object undergoes line

[NDA-II 2014]

- (a) an acceleration motion
- (b) a decelerated motion
- (c) a uniform non-zero velocity motion
- (d) a zero velocity motion

DIRECTION: The following item consists of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these items using the code given below. [NDA-II 2014]

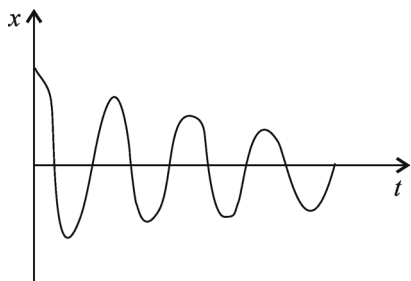
Code:

- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I.

Physics

- (b) Both the statements are individually true but Statement II is not the correct explanation of Statement I.
- (c) Statement I is true but Statement II is false.
- (d) Statement I is false but Statement II is true.
202. **Statement I:** A body moving in a circular path is acted or upon by the centripetal force.
Statement II: Centripetal force acting on the body is doing work to keep it rotating in the circular path.
203. Fahrenheit and Celsius are the two scales used for measuring temperature. If the numerical value of a temperature recorded in both the scales is found to be same, what is the temperature? [NDA-II 2014]
 (a) -40° (b) $+40^\circ$
 (c) $+72^\circ$ (d) -72°
204. A thermodynamic process where no heat is exchanged with the surroundings is [NDA-II 2014]
 (a) isothermal (b) adiabatic
 (c) isobaric (d) isotropic
205. Heat given to a body which raises its temperature by 1°C is known as [NDA-II 2014]
 (a) water equivalent
 (b) thermal capacity
 (c) specific heat
 (d) temperature gradient
206. Light waves are [NDA-II 2014]
 (a) electro-mechanical waves
 (b) electro-magnetic waves
 (c) electro-optical waves
 (d) magneto-optical waves
207. Optical glass used in the construction of spectacles is made by [NDA-II 2014]
 (a) flint glass (b) Crookes glass
 (c) quartz glass (d) hard glass
208. Which one of the following processes explains the splitting of a beam of white light into its constituent colours? [NDA-II 2014]
 (a) Dispersion (b) Reflection
 (c) Diffraction (d) Polarization
209. Light waves projected on oil surface show seven colours due to the phenomenon of [NDA-II 2014]
 (a) polarization (b) refraction
 (c) reflection (d) interference
210. A ray of light travels from a medium of refractive index n_1 to a medium of refractive index n_2 . If angle of incidence is r $\frac{\sin i}{\sin r}$ [NDA-II 2014]
 (a) n_1 (b) n_2
 (c) $\frac{n_2}{n_1}$ (d) $\frac{n_1}{n_2}$
211. The electric field inside a perfectly conducting hollow object is [NDA-II 2014]
 (a) 4
 (b) infinite
 (c) zero
 (d) dependent upon the shape of the object
212. A cyclotron accelerates particles of mass m and charge q . The energy of particles emerging is proportional to [NDA-II 2014]
 (a) q^2/m (b) q/m^2
 (c) q^2/m^2 (d) q
213. The working of a microwave oven involves [NDA-II 2014]
 (a) absorption of microwaves by matter
 (b) reception of microwaves by optical fibre
 (c) microwave amplification by stimulated emission of radiation
 (d) transmission of microwaves through a metal
214. Which one of the following circuit elements is an active component? [NDA-II 2014]
 (a) Resistor (b) Transistor
 (c) Inductor (d) Capacitor
215. Which of the following are the correct parameters for the common domestic power supply in India? [NDA-II 2014]
 (a) 220 V, 110 Hz (b) 220 V, 50 Hz
 (c) 110V, 220 Hz (d) 110 V, 50 Hz
- DIRECTION:** The following item consists of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these items using the code given below. [NDA-II 2014]
- Code:**
- (a) Both the statements are individually true and Statement II is the correct explanation of Statement I.
- (b) Both the statements are individually true but Statement II is not the correct explanation of Statement I.
- (c) Statement I is true but Statement II is false
- (d) Statement I is false but Statement II is true.
216. **Statement I:** It is not necessary that every bar magnet has one North Pole and one South Pole.
Statement II: Magnetic poles occur in pair.
217. A balloon filled up with gas would only go up in air if it is filled up with [NDA-I 2014]
 (a) a gas whose density is lower than air
 (b) a gas whose density is higher than air
 (c) cold air
 (d) water vapour
218. The latest discovered state of matter is [NDA-I 2014]
 (a) solid (b) Bose-Einstein condensate
 (c) plasma (d) liquid

219. If the distance S covered by a moving car in rectilinear motion with a speed v in time t is given by $S = vt$, then the car undergoes [NDA-I 2014]
- a uniform acceleration
 - a non-uniform acceleration
 - a uniform velocity
 - a non-uniform velocity
220. How many cubic centimeters (cm^3) are in a cubic metre (m^3)? [NDA-I 2014]
- 10^3
 - 10^6
 - 10^9
 - 10^{12}
221. A passenger in a moving train tosses a coin upward which falls behind him. It implies that the motion of the train is [NDA-I 2014]
- accelerated
 - uniform
 - retarded
 - along the circular tracks
222. Planet A has double the radius than that of Planet B. If the mass of Planet A is 4 times heavier than the mass of Planet B, which of the following statements regarding weight of an object is correct? [NDA-I 2014]
- Heavier on Planet A than on Planet B
 - Heavier on Planet B than on Planet A
 - Same on both the Planets
 - Cannot be measured on Planet B
223. The displacement (x) time (t) graph given below approximately represents the motion of a [NDA-I 2014]



- simple pendulum placed in a vacuum
 - simple pendulum immersed in water
 - simple pendulum placed in outer space
 - point mass moving in air
224. Bernoulli's principle is based on which one among the following laws? [NDA-I 2014]
- Conservation of mass
 - Conservation of momentum
 - Conservation of angular momentum of energy
 - Conservation of energy

DIRECTION: The following item consist of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these items using the code given below: [NDA-I 2014]

Code:

- Both the statements are individually true and Statement II is the correct explanation of Statement I.
 - Both the statements are individually true but Statement II is not the correct explanation of Statement I.
 - Statement I is true but Statement II is false
 - Statement I is false but Statement II is true.
225. **Statement I:** The acceleration due to gravity decreases with increase in height from the surface of the Earth.
Statement II: The acceleration due to gravity is inversely proportional to the square of the distance from the centre of the Earth. [NDA-I 2014]
226. Which one among the following waves bats use to detect om the obstacles in their flying path? [NDA-I 2014]
- Infrared waves
 - Electromagnetic waves
 - Ultrasonic waves
 - Radio waves
227. A sound wave has frequency of 2 kHz and wavelength of 35 cm. If an observer is 1.4 km away from the source, after what time interval could the observer hear the sound? [NDA-I 2014]
- 2 s
 - 20 s
 - 0.5 s
 - 4 s
228. Sound waves are similar to the waves [NDA-I 2014]
- of laser light passing through air
 - generated in a stretched wire by hitting or plucking the wire
 - generated in a pipe filled with air by moving the piston attached to the pipe up and down
 - generated by the mobile phone towers
229. In optical instruments, the lenses are used to form image by the phenomenon of [NDA-I 2014]
- reflection
 - refraction
 - scattering
 - diffusion
230. While looking at an image formed by a convex lens (one half of the lens is covered with a black paper), which one of the following will happen to the image? [NDA-I 2014]
- Half of the image will be visible
 - Intensity of the image will be diminished
 - Image will be inverted now
 - One can see an image of smaller size
231. If speed of light in air is 3×10^8 m/s, the speed of light in glass (with refractive index 1.5) would be [NDA-I 2014]
- 2×10^8 m/s
 - 4.5×10^8 m/s
 - 3×10^8 m/s
 - 1.5×10^8 m/s

Physics

232. Consider the following statements:

A real image [NDA-I 2014]

1. can be formed on a screen
2. is always magnified and inverted

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

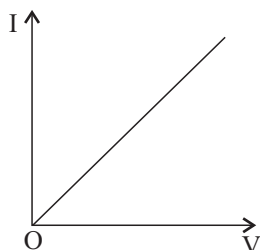
233. The phenomenon of electromagnetic induction implies a production of induced [NDA-I 2014]

- (a) resistance in a coil when the magnetic field changes with time
(b) current in a coil when an electric field changes with time
(c) current in a coil when a magnetic field changes with time
(d) voltage in a coil when an electric field changes with time

234. A fuse is used in an electric circuit to [NDA-I 2014]

- (a) break the circuit when excessive current flows through the circuit
(b) break the circuit when power gets off
(c) indicate if the current is flowing uninterrupted
(d) complete the circuit for flow of current

235. The current (I), voltage (V) plot of a certain electronic device is given below. The device is [NDA-I 2014]



- (a) a semiconductor
(b) a conductor which obeys Ohm's law
(c) a superconductor
(d) an insulator

236. Van de Graaff generator is used for [NDA-I 2014]

- (a) accelerating charged particles
(b) generating large currents
(c) generating electric field
(d) generating high-frequency voltage

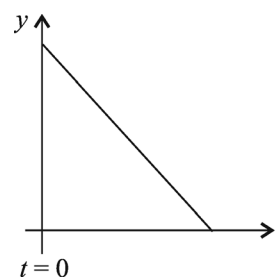
237. During circuit short-circuiting, the current flowing in the electrical [NDA-I 2014]

- (a) reduces substantially
(b) does not change
(c) increases instantaneously
(d) varies continuously

238. A semiconducting device is connected in a series circuit with a battery and a resistance. Current is found to pass through the circuit. If the polarity of the battery is reversed, the current drops to zero. The device may be [NDA-I 2014]

- (a) *p*-type semiconductor
(b) *n*-type semiconductor
(c) an intrinsic semiconductor
(d) *p-n* junction

239. Which one among the following situation is best represented by the velocity - time plot shown above? [NDA-II 2013]

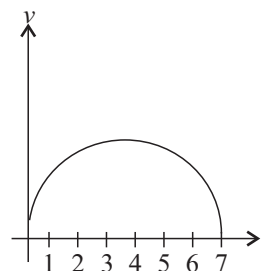


- (a) Uniform motion of a particle on a circle
(b) Accelerated motion of a particle which has a non-zero initial velocity
(c) Decelerated motion of a particle which has an initial non-zero velocity
(d) Decelerated motion of a particle which has no initial velocity

240. Suppose we have an iron nail and an iron ball of same mass. When submerged in water, the iron ball may float but the nail always sinks. This is because [NDA-II 2013]

- (a) buoyant force on the ball is larger than that of the nail due to their shapes.
(b) viscous force on the ball is higher.
(c) viscous force on the nail is higher.
(d) gravitational force affects the ball differently from the nail.

241. The plot given above represents the velocity of a particle (in m/s) with time (in seconds). Assuming that the plot represents a semi-circle, distance traversed by the particle at the end of 7 seconds is approximately. [NDA-II 2013]

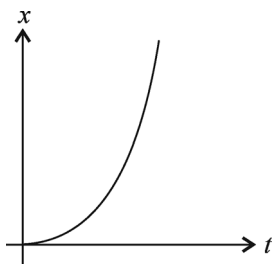


- (a) 19 m (b) 7 m
(c) 3.2 m (d) 4.75 m

242. A bullet of mass 20 gm is fired in the horizontal direction with a velocity 150 m/s from a pistol of mass 1 kg. Recoil velocity of the pistol is [NDA-II 2013]

- (a) 3 m/s (b) 3 km/s
(c) 300 m/s (d) 1/3 m/s

243. The plot given below represents displacement 'x' of a particle with time 't'. The particle is [NDA-II 2013]



- (a) moving with uniform velocity.
(b) moving with acceleration.
(c) moving with deceleration.
(d) executing a periodic motion.

244. Motion, of a particle can be described in x-direction by $x = a \sin \omega t$, and y-direction by $y = b \cos \omega t$. The particle is moving on buoyant force on the coin is more and acts in the downward direction. [NDA-II 2013]

- (a) a circular path of radius 'a'.
(b) a circular path of radius 'b'.
(c) an elliptical path.
(d) a straight line.

245. A piece of paper and a coin both having the same mass are dropped from the 10th floor of building. The piece of paper would take more time to reach the ground because [NDA-II 2013]

- (a) gravitational pull on the paper is less than the coin.
(b) buoyant force on the piece of paper is more than that on the coin.
(c) buoyant force on the coin is more and acts in the downward direction.
(d) the piece of paper takes a longer path to reach the ground.

246. Power required by a boy of mass 30 kg to run up a staircase of 40 steps in 10 seconds is (Height of each step is 15 cm) (Take $g = 10 \text{ m/s}^2$) [NDA-II 2013]

- (a) 1800 Watt (b) 180 Watt
(c) 18000 Watt (d) 18 Watt

247. The weight of an object may be assigned by using Newton's [NDA-II 2013]

- (a) first law of motion.
(b) second law of motion.

- (c) third law of motion.
(d) laws of gravitation.

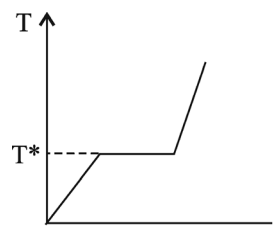
248. Pressure of a gas increases due to increase of its temperature because at higher temperature [NDA-II 2013]

- (a) gas molecules repel each other more.
(b) potential energy of the gas molecules is higher.
(c) kinetic energies of the gas molecules are higher.
(d) gas molecules attract each other more.

249. A pressure cooker works on the principle of [NDA-II 2013]

- (a) elevation of boiling point of water by application of pressure.
(b) making the food-grains softer by application of pressure.
(c) making the food-grains softer by application of pressure and temperature.
(d) keeping the food-grains inside steam for a longer time.

250. The figure given below shows the temperature (T) - time (t) plot when we start heating a piece of naphthalene. The temperature (T*) at the plateau of the curve signifies [NDA-II 2013]



- (a) boiling point of naphthalene.
(b) freezing point of naphthalene.
(c) melting point of naphthalene.
(d) the temperature when naphthalene undergoes a chemical change upon heating.

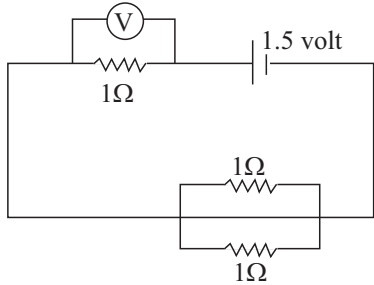
251. If the length of a simple pendulum is being increased by 4-fold, time period of oscillation will be [NDA-II 2013]

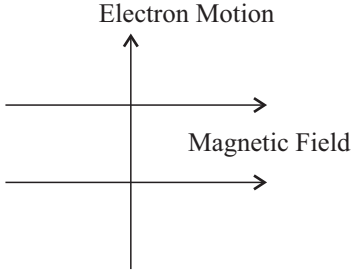
- (a) decreased by 4-fold.
(b) increased by 4-fold.
(c) decreased to half of the initial value.
(d) increased by a factor of 2 of its initial value.

252. The ceilings of a concert hall are generally curved [NDA-II 2013]

- (a) because they reflect the sound to the audience.
(b) because they can absorb noise.
(c) to have better aeration in the hall.
(d) as any sound from outside cannot pass through a curved ceiling.

Physics

253. White light while passing through a glass prism breaks up into light of different colours because
[NDA-II 2013]
- refractive index of glass for different colours of light is different.
 - glass prism absorbs white light and emits lights of several colours in different directions.
 - of total internal reflection of white light on surfaces of the prism.
 - of the interference of different colours inside the prism.
254. Rays of light get refracted while passing from air to glass because [NDA-II 2013]
- density of glass is higher than that of air.
 - they cannot be reflected from a glass surface.
 - glass absorbs energy from the light rays.
 - speed of light in glass is less than the speed of light in air.
255. During sunrise and sunset, sun appears reddish-orange because [NDA-II 2013]
- during that time sun emits only reddish-orange light.
 - all other colours are absorbed by the atmosphere.
 - reddish-orange light is least scattered by the atmosphere.
 - all other colours apart from reddish-orange are reflected back by the atmosphere.
256. A beautiful rainbow on the sky is due to the [NDA-II 2013]
- dispersion of sunlight from a water droplet only.
 - reflection of sunlight from a water droplet only.
 - reflection and refraction of sunlight from a water droplet only.
 - refraction, dispersion and reflection of sunlight from a water droplet.
257. Two conducting wires A and B are made of same material. If the length of B is twice that of A and the radius of circular cross-section of A is twice that of B, then their resistances R_A and R_B are in the ratio [NDA-II 2013]
- 2 : 1
 - 1 : 2
 - 1 : 8
 - 1 : 4
258. When long dry hair is brushed the strands often move from each other because while brushing [NDA-II 2013]
- air is being blown through the strands.
 - static electric charges are being induced on the hair.
 - mechanical energy is being transferred into heat energy.
 - the gravitational attraction among the strands becomes smaller.
259. An electric heater is rated 1500 watt. If electric power costs ₹ 2 per kilo-watt-hour, then the cost of power of 10 hours running of the heater is [NDA-II 2013]
- ₹ 30
 - ₹ 15
 - ₹ 150
 - ₹ 25
260. What should be the reading of the voltmeter in the circuit given above? [NDA-II 2013]
(All the resistance are equal to 1 Ω and the battery is of 1.5 volt)
- 
- The circuit diagram shows a battery of 1.5 volt connected in series with a 1 Ω resistor and a voltmeter (V). This series combination is connected to a parallel network of two 1 Ω resistors.
- 1.5 volt
 - 0.66 volt
 - 1 volt
 - 2 volt
261. Ohm's law can also be taken as a statement for [NDA-II 2013]
- conservation of energy.
 - conservation of electric charge.
 - conservation of angular momentum.
 - non-conservation of momentum of the flowing charges.
262. Which one among the following properties of a proton may change while it moves freely in a magnetic field? [NDA-II 2013]
- Speed
 - Charge
 - Mass
 - Velocity
263. A current of 0.5A is drawn by a filament of an electric bulb for 20 minutes. The amount of electric charge that flows through the circuit is [NDA-II 2013]
- 1C
 - 10C
 - 600 C
 - 300 C
264. This question consist of two statements, one labelled as the Assertion (A) and the other as Reason (R). You are to examine these two statements carefully and select the answers to these items using the codes given below:
- Assertion (A):** If the filament of a light bulb is not uniform horizontal its life is shortened.
- Reason (R):** Resistance of glowing light bulb is less than that of bulb at room temperature.
- [NDA-I 2013]

- (a) Both A and R are individually true and R is the correct explanation of A
 (b) Both A and R are individually true but R is NOT the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true
265. A current I flows through a potential difference V in an electrical circuit containing a resistance R . The product of V and I , i.e., VI may be understood as [NDA-I 2013]
 (a) resistance R
 (b) heat generated by the circuit
 (c) thermal power radiated by the circuit
 (d) rate of change of resistance
266. A positively charged particle projected towards west is deflected towards north by a magnetic field. The direction of the magnetic field is [NDA-I 2013]
 (a) towards south
 (b) towards east
 (c) in downward direction
 (d) in upward direction
267. Metal used to make wires for safety fuses must have both up and down currents A positively charged [NDA-I 2013]
 (a) very low resistivity and high melting point
 (b) high resistivity and low melting point
 (c) low resistivity and low melting point
 (d) high resistivity and high melting point
268. A current-carrying wire is known to produce magnetic lines of force around the conducting straight wire, the direction of the lines of force may be described by:
 (a) left-hand thumb rule for up-current and right-hand thumb rule for down current [NDA-I 2013]
 (b) right-hand thumb rule for up-current and left-hand thumb rule for down current
 (c) right-hand thumb rule for both up and down currents
 (d) left-hand thumb rule for both up and down current
269. Ohm's law defines [NDA-I 2013]
 (a) a resistance
 (b) current only
 (c) voltage only
 (d) both current and voltage
270. Imagine a current carrying wire with the direction of current downward or into the page. The direction of magnetic field lines is [NDA-I 2013]
 (a) clockwise
 (b) anti-clockwise
 (c) into the page
 (d) out of the page
271. The motion of an electron in presence of a magnetic field is depicted in the figure. Force acting on the electron will be directed [NDA-I 2013]
- 
- (a) into the page
 (b) out of the page
 (c) opposite to the motion of the electron
 (d) along the motion of the electron
272. This question consist of two statements, one labelled as the Assertion (A) and the other as Reason (R), You are to examine these two statements carefully and select the answers to these items using the codes given below:
Assertion (A): Radio does not work in a moving train unless aerial is put outside the window. [NDA-I 2013]
Reason (R): The train compartment acts as a hollow cylinder and charge is centred which does not allow radio to work.
 (a) Both A and R are individually true and R is the correct explanation of A.
 (b) Both A and R are individually true but R is NOT the correct explanation of A.
 (c) A is true but R is false.
 (d) A is false but R is true.
273. Sun emits energy in the form of electromagnetic radiation. The following help in the generation of solar energy. Arrange them in the right sequence beginning from the starting of the cycle: [NDA-I 2013]
 1. Hydrogen is converted to helium at very high temperatures and pressures.
 2. The energy finds its way to sun's surface.
 3. A vast quantity of energy is generated by nuclear fusion.
 Select the correct answer using the code given below.
 (a) 1-2-3 (b) 2-3-1
 (c) 3-2-1 (d) 1-3-2
274. Radioactive decay provides an internal source of heat for the earth. This helps in the formation of which type of rocks? [NDA-I 2013]
 (a) Igneous (b) Sedimentary
 (c) Metamorphic (d) All of the above

Physics

275. The spread in colours in a rainbow on sky is primarily due to [NDA-I 2013]

- (a) dispersion of sunlight
- (b) reflection of sunlight
- (c) refraction of sunlight
- (d) total internal reflection of sunlight

276. Gravitational force shares a common feature with electromagnetic force. In both cases, the force is

- (a) between massive and neutral objects
- (b) between charged objects
- (c) a short range
- (d) a long range

277. The displacement of a particle at time t is given by

$$\vec{x} = at\hat{i} + bt\hat{j} + \frac{c}{2}t^2\hat{k}$$

where a , b and c are positive constants. Then the particle is

- (a) accelerated along \hat{k} direction
- (b) decelerated along \hat{k} direction
- (c) decelerated along \hat{j} direction
- (d) accelerated along \hat{j} direction

278. A particle is moving freely. Then its [NDA-I 2013]

- (a) kinetic energy is always greater than zero
- (b) potential energy is greater than zero and kinetic energy is less than zero
- (c) potential energy is less than zero and kinetic energy is greater than zero
- (d) potential energy is zero and kinetic energy is less than zero

279. A force F is applied on a body (which moves on a straight line) for a duration of 3 s. The momentum of the body changes from 10 g cm/s to 40 g cm/s. The magnitude of the force F is [NDA-I 2013]

- (a) 10 dyne
- (b) 10 newton
- (c) 120 dyne
- (d) 12 dyne

280. If an object undergoes a uniform circular motion, then its [NDA-I 2013]

- (a) acceleration remains uniform
- (b) velocity changes
- (c) speed changes
- (d) velocity remains uniform

281. If d denotes the distance covered by a car in time t and \vec{s} denotes the displacement by the car during the same time, then : [NDA-I 2013]

- (a) $d \leq |\vec{s}|$
- (b) $d = |\vec{s}|$ only
- (c) $d \geq |\vec{s}|$
- (d) $d < |\vec{s}|$

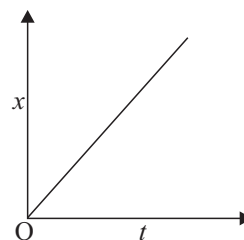
282. An ant is moving on thin (negligible thickness) circular wire. How many coordinates do you require to completely describe the motion of the ant ? [NDA-I 2013]

- (a) One
- (b) Two
- (c) Three
- (d) Zero

283. A car is moving with a uniform speed. However its momentum is changing. Then the car [NDA-I 2013]

- (a) may be on an elliptical path
- (b) is moving on a straight path without acceleration
- (c) is moving on a straight path with acceleration
- (d) is moving without any acceleration

284. The motion of a particle is given by a straight line in the graph given above drawn with displacement (x) and time (t).



Which one among the following statements is correct?

[NDA-I 2013]

- (a) The velocity of the particle is uniform
- (b) The velocity of the particle is non-uniform
- (c) The speed is uniform and the particle is moving on a circular path
- (d) The speed is non-uniform and the particle is moving on a straight line path

285. An object is undergoing a non-accelerated change of momentum is [NDA-I 2013]

- (a) a non-zero constant
- (b) zero
- (c) not a constant
- (d) None of the above

286. A motor vehicle is moving on a circle with a uniform speed. The net acceleration of the vehicle is [NDA-I 2013]

- (a) zero
- (b) towards the centre of circle
- (c) away from the centre along the radius of the circle
- (d) perpendicular to the radius and along the velocity

287. The displacement of a particle is given by $x = \cos^2 t$. The motion is [NDA-I 2013]

- (a) simple harmonic
- (b) periodic but not simple harmonic
- (c) non-periodic
- (d) None of the above

ANSWERS

1.	(b)	2.	(a)	3.	(b)	4.	(d)	5.	(d)	6.	(b)	7.	(c)	8.	(d)	9.	(a)	10.	(a)
11.	(c)	12.	(b)	13.	(a)	14.	(c)	15.	(c)	16.	(b)	17.	(b)	18.	(b)	19.	(c)	20.	(a)
21.	(a)	22.	(d)	23.	(c)	24.	(d)	25.	(b)	26.	(b)	27.	(d)	28.	(c)	29.	(b)	30.	(b)
31.	(c)	32.	(d)	33.	(c)	34.	(c)	35.	(b)	36.	(d)	37.	(a)	38.	(b)	39.	(a)	40.	(c)
41.	(a)	42.	(a)	43.	(d)	44.	(c)	45.	(b)	46.	(c)	47.	(b)	48.	(b)	49.	(a)	50.	(a)
51.	(b)	52.	(d)	53.	(a)	54.	(b)	55.	(c)	56.	(d)	57.	(d)	58.	(c)	59.	(a)	60.	(a)
61.	(a)	62.	(d)	63.	(b)	64.	(a)	65.	(a)	66.	(c)	67.	(b)	68.	(a)	69.	(d)	70.	(d)
71.	(d)	72.	(d)	73.	(c)	74.	(a)	75.	(a)	76.	(c)	77.	(b)	78.	(d)	79.	(b)	80.	(a)
81.	(c)	82.	(a)	83.	(d)	84.	(b)	85.	(a)	86.	(a)	87.	(b)	88.	(d)	89.	(d)	90.	(c)
91.	(a)	92.	(a)	93.	(b)	94.	(d)	95.	(d)	96.	(b)	97.	(a)	98.	(d)	99.	(a)	100.	(b)
101.	(c)	102.	(b)	103.	(b)	104.	(a)	105.	(d)	106.	(c)	107.	(d)	108.	(a)	109.	(d)	110.	(a)
111.	(b)	112.	(c)	113.	(a)	114.	(b)	115.	(b)	116.	(a)	117.	(a)	118.	(c)	119.	(b)	120.	(c)
121.	(c)	122.	(d)	123.	(b)	124.	(d)	125.	(a)	126.	(c)	127.	(a)	128.	(b)	129.	(b)	130.	(c)
131.	(a)	132.	(a)	133.	(c)	134.	(d)	135.	(c)	136.	(d)	137.	(a)	138.	(c)	139.	(c)	140.	(a)
141.	(a)	144.	(c)	143.	(b)	144.	(b)	145.	(c)	146.	(c)	147.	(d)	148.	(b)	149.	(b)	150.	(d)
151.	(d)	152.	(a)	153.	(c)	154.	(b)	155.	(b)	156.	(b)	157.	(a)	158.	(b)	159.	(b)	160.	(c)
161.	(c)	162.	(a)	163.	(a)	164.	(a)	165.	(d)	166.	(c)	167.	(a)	168.	(c)	169.	(d)	170.	(d)
171.	(c)	172.	(b)	173.	(a)	174.	(c)	175.	(b)	176.	(a)	177.	(c)	178.	(b)	179.	(a)	180.	(b)
181.	(c)	182.	(d)	183.	(a)	184.	(c)	185.	(d)	186.	(c)	187.	(a)	188.	(a)	189.	(c)	190.	(d)
191.	(c)	192.	(a)	193.	(c)	194.	(c)	195.	(a)	196.	(b)	197.	(d)	198.	(b)	199.	(b)	200.	(a)
201.	(d)	202.	(c)	203.	(a)	204.	(b)	205.	(c)	206.	(b)	207.	(a)	208.	(a)	209.	(b)	210.	(c)
211.	(c)	212.	(a)	213.	(c)	214.	(a)	215.	(b)	216.	(d)	217.	(a)	218.	(c)	219.	(c)	220.	(b)
221.	(a)	222.	(c)	223.	(b)	224.	(d)	225.	(a)	226.	(c)	227.	(a)	228.	(c)	229.	(b)	230.	(b)
231.	(a)	232.	(c)	233.	(c)	234.	(a)	235.	(b)	236.	(d)	237.	(c)	238.	(d)	239.	(c)	240.	(a)
241.	(a)	242.	(a)	243.	(b)	244.	(c)	245.	(b)	246.	(b)	247.	(c)	248.	(a)	249.	(a)	250.	(c)
251.	(d)	252.	(a)	253.	(a)	254.	(a)	255.	(c)	256.	(d)	257.	(a)	258.	(b)	259.	(a)	260.	(c)
261.	(a)	262.	(d)	263.	(c)	264.	(c)	265.	(c)	266.	(d)	267.	(b)	268.	(c)	269.	(a)	270.	(b)
271.	(b)	272.	(c)	273.	(d)	274.	(a)	275.	(a)	276.	(d)	277.	(a)	278.	(a)	279.	(a)	280.	(b)
281.	(c)	282.	(a)	283.	(a)	284.	(b)	285.	(b)	286.	(a)	287.	(c)						