1. From a disc of mass 'M' and radius 'R', a circular hole of diameter 'R' is cut whose rim passes through the centre. The moment of inertia of the remaining part of the disc about perpendicular axis passing through the centre is[MHT-CET 2020]

(a) $\frac{7MR^2}{32}$ (b) $\frac{11MR^2}{32}$ (c) $\frac{9MR^2}{32}$ (d) $\frac{13MR^2}{32}$

2. An electron enters in high potential region V_2 from lower potential region V_1 then its velocity

(a) Will increase

(b) Will change in direction but not in magnitude

(c) No change in direction of field

(d) No change in direction perpendicular to field

3. An oil flowing on water seems coloured due to interference. For observing this effect, the approximate thickness of the oil film should be

(a) 100 Š (b) 10000 (c) 1 mm (d) 1 cm

4. A ray of light travelling through rarer medium is incident at very small angle 'i' on a glass slab and after refraction its velocity is reduced by 20%. The angle of deviation is[MHT-CET 2016]

(a) $\frac{i}{8}$ (b) $\frac{i}{5}$ (c) $\frac{i}{2}$ (d) $\frac{4i}{5}$

5. An electron of mass 'm' and charge 'q' is accelerated from rest in electric field 'E'. The velocity acquired by the electron in travelling a distance 'x' is[MHT-CET 2020]

(a) $(Em/qx)^{\frac{1}{2}}$ (b) $(Eq/mx)^{\frac{1}{2}}$ (c) $(2Eqx/m)^{\frac{1}{2}}$

(d) $(2Eq/mx)^{\frac{1}{2}}$

6. The power loss in AC circuit will be minimum when

(a) Resistance is high, inductance is high

(b) Resistance is high, inductance is low

(c) Resistance is low, inductance is low

(d) None of the above

7. An astronaut in a satellite feels weightlessness because

(a) Acceleration due to gravity is zero in the orbit of satellite

(b) There is no gravitational fields inside the satellite

(c) The gravitational force on him balances the normal reaction

(d) The normal reaction on him is zero

8. Four statements regarding ethers are given below. Identify the FALSE statements. (i) Ethers are named as alkoxy derivatives of alkane. (ii) The larger alkyl group along with oxygen atom is named as alkoxy group. (iii) The larger alkyl group is considered as the parent alkane. (iv) The position of the alkoxy group is indicated by the maximum number.

(a) (i) and (iii) (b) (ii) and (iv) (c) (ii) and (iii)

(d) (i) and (iv)

9. The final product of hydrolysis oxoacids of phosphorus contain a P P bond?

(a) $H_6P_4O_{13}$ (b) $H_5P_3O_{10}$ (c) $H_4P_4O_{12}$ (d) H_3PO_4

10. The decreasing leaving group order of the following is: i. $F^{\ominus}$ ii. $Cl^{\ominus}$ iii. $Br^{\ominus}$ iv. $I^{\ominus}$

(a) (i)>(ii)>(iii)>(iv) (b) (iv)>(iii)>(ii)>(i)

(c) (ii)>(i)>(iii)>(iv) (d) (ii)>(i)>(iv)>(iii)

11. Which of the following is NOT the mineral of iron? [MHT-CET 2019]
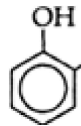
(a) Magnetite (b) Limonite (c) Haematite

(d) Corundum

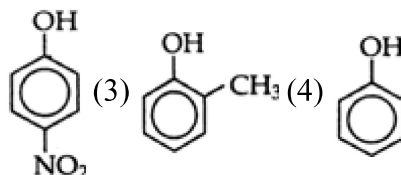12. _____ is used for ending charge on colloidal solution.

(a) Compounds (b) Electrolytes

(c) Positively charged ions (d) Electron

13. For the reaction The heat of decomposition of water per mole is [MHT CET 2007]

(a) 286.6 kJ (b) 573.2 kJ (c) -28.66 kJ (d) Zero

14. Which is corrects decreasing order of acidic strength of substituted phenol ? (1)

(a) 2 > 1> 3 > 4 (b) 3 > 1 > 2 > 4 (c) 2 > 1 > 4 >3

(d) $3 > 2 > 4 > 1$

15. If $-$ is the angle between the lines in which the planes $3x - 7y - 5z = 1$ and $5x - 13y + 3z + 2 = 0$ cuts the $8x - 11y + 2z = 0$, then $\sin\theta$ is :

(a) $\dfrac{1}{2}$ **(b)** $\dfrac{1}{\sqrt{2}}$ **(c)** $\dfrac{\sqrt{3}}{2}$ **(d)** 1

16. If $\bar{a} = \bar{i} + \bar{j}$ and $\bar{b} = \bar{j} + \bar{k}$ and $\bar{c} = \bar{i} + \bar{k}$ then the unite vector In the direction of vector $\bar{a} - 2\bar{b} + 3\bar{c}$ is

(a) $\dfrac{1}{\sqrt{2}}(4\bar{i} - \bar{j} - \bar{k})$ **(b)** $\dfrac{1}{3\sqrt{2}}(4\bar{i} - \bar{j} + \bar{k})$

(c) $\dfrac{1}{3\sqrt{2}}(4\bar{i} + \bar{j} - \bar{k})$ **(d)** $\dfrac{1}{\sqrt{2}}(4\bar{i} - \bar{j} + \bar{k})$

17. The equation $(x^2 + y^2)(h^2 + k^2 - a^2) = (hx + ky)^2$ represents a pair of perpendicular lines if :

(a) $h^2 + k^2 = 2a^2$ **(b)** $(h+k)(h-k) = 2a^2$

(c) $h^2 + k^2 = a^2$ **(d)** $h^2 + k^2 = 0$

18. The solution of the differential equation $2x^2 y \dfrac{dy}{dx} = \tan(x^2 y^2) - 2xy^2$, where $y = \sqrt{\dfrac{\pi}{2}}$ when x= 1 is

(a) $\sin(x^2 y^2) = e^{x-1}$ **(b)** $\sin(x^2 y^2) = x$

(c) $\cos(x^2 y^2) + x = 0$ **(d)** $\sin(x^2 y^2) = e.e^x$

19. The objective function of the standard form of L.P.P. is :

(a) Equal to the objective function of the original L.P.P.

(b) Not equal to the objective function of the original L.P.P.

(c) Less than to the objective function of the original L.P.P.

(d) None of these

20. $\displaystyle\int_{0}^{\frac{\pi}{4}} \dfrac{1 - \tan x}{1 + \tan x} dx =$

(a) $-log\sqrt{2}$ **(b)** $log\sqrt{2}$ **(c)** $-log2$ **(d)** $log2$

21. $\lim_{x \to 0} \left(\dfrac{1+2x}{1-2x}\right)^{1/x} =$ [MHT-CET 2007]

(a) e **(b)** e^2 **(c)** e^3 **(d)** e^4

22. The point of intersection of the lines given by $6x^2 + xy - 40y^2 - 35x - 83y + 11 = 0$ is

(a) (-3, -1) **(b)** (-3, 1) **(c)** (3, -1) **(d)** (3, 1)