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Father of Indian nuclear programme
Adams Prize (1942)
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MSAT (Mathematics & Science Ability Test)

10th Std. 50 Questions 45 Minutes 200 Marks Negative Marking (+4, -1)

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1. **The weight of a body at the centre of the earth is**
(a) Zero (b) Infinite
(c) Same as on the surface of earth (d) None of the above

2. **If the distance between two masses is doubled, the gravitational attraction between them**
(a) Is doubled (b) Becomes four times
(c) Is reduced to half (d) Is reduced to a quarter

3. **Mass M is divided into two parts xM and $(1-x)M$. For a given separation, the value of x for which the gravitational attraction between the two pieces becomes maximum is**
(a) $\frac{1}{2}$ (b) $\frac{3}{5}$ (c) 1 (d) 2

4. **Two sphere of mass m and M are situated in air and the gravitational force between them is F. The space around the masses is now filled with a liquid of specific gravity 3. The gravitational force will now be**
(a) F (b) $\frac{F}{3}$ (c) $\frac{F}{9}$ (d) $3F$

5. **When a body is taken from the equator to the poles, its weight**
(a) Remains constant (b) Increases (c) Decreases
(d) Increases at N-pole and decreases at S-pole

6. **A body weighs 700 *gm wt* on the surface of the earth. How much will it weigh on the surface of a planet whose mass is $\frac{1}{7}$ and radius is half that of the earth**
(a) 200 *gm wt* (b) 400 *gm wt*
(c) 50 *gm wt* (d) 300 *gm wt*

7. **The weight of an object in the coal mine, sea level, at the top of the mountain are W_1, W_2 and W_3 respectively, then**
(a) $W_1 < W_2 > W_3$ (b) $W_1 = W_2 = W_3$ (c) $W_1 < W_2 < W_3$ (d) $W_1 > W_2 > W_3$

8. **Which of the following could not produce a virtual image**
(a) Plane mirror (b) Convex mirror (c) Concave mirror
(d) All the above can produce a virtual image

9. An object $5cm$ tall is placed 0.5 m from a concave spherical mirror which has a radius of curvature of $20cm$ The size of the image is

(a) 2.5 cm (b) 10 cm (c) 1.25 cm (d) 3.75 cm

10. The refractive index of a certain glass is 1.5 for light whose wavelength in vacuum is 6000 Å. The wavelength of this light when it passes through glass is

(a) 4000 Å (b) 6000 Å (c) 9000 Å (d) 15000 Å

11. A light wave has a frequency of 4×10^{14} Hz and a wavelength of 5×10^{-7} meters in a medium. The refractive index of the medium is

(a) 1.5 (b) 1.3 (c) 1.0 (d) 0.66

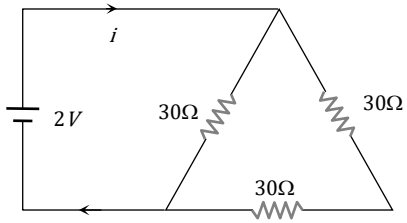
12. The current in the adjoining circuit will be

(a) $\frac{1}{45}ampere$

(b) $\frac{1}{15}ampere$

(c) $\frac{1}{10}ampere$

(d) $\frac{1}{5}ampere$



13. 'Mirage' is a phenomenon due to

(a) Reflection of light (b) Refraction of light

(c) Total internal reflection of light (d) Diffraction of light

14. A lens of power + 2 diopters is placed in contact with a lens of power – 1 diopter. The combination will behave like

(a) A convergent lens of focal length 50 *cm* (b) A divergent lens of focal length 100 *cm*

(c) A convergent lens of focal length 100 *cm* (d) A convergent lens of focal length 200 *cm*

15. The direction of magnetic lines of force produced by passing a direct current in a conductor is given by

(a) Lenz's law (b) Fleming's left hand rule

(c) Right hand palm rule (d) Maxwell's law

16. Which of the following is not an element?

a) Diamond b) Silica c) Lawrencium d) Graphite

17. Which of the following is not a unit of length?

a) gram b) Angstrom c) Micron d) pico metre

18. Kinetic energy of molecules is highest in

a) Gases b) Solids c) Liquids d) Solutions

19. Atomic number of atoms represents

a) Protons & Neutrons b) Protons Only

c) Protons or Neutrons d) Electrons & Neutrons

20. Modern periodic table contain ---group &---period

a) 7 & 8 b) 18 & 7 c) 17 & 8 d) 8 & 17

21. Which metal is in liquid state

a) Na b) Mg c) Au d) Hydrogyrum

22. Which non-metal is in liquid state

a) I b) Br c) N d) P

23. The valency of carbon is

a) 2 b) 4 c) 3 d) 1

24. The formula of ozone is

a) O_3 b) O_4 c) O_2 d) O

25. If the atomic number = 19 then the element is

a) P b) C c) N d) K

26. IUPAC name of CH_3CH_2OH is

a) ethanal b) ethanol c) methanol d) ethyl alcohol

27. PH of water is

a) less than 7 b) greater than 7 c) equal to 7 d) equal to 1

28. What is the formula of maximum number of electron that can be accommodate in a shell?

a) $2n^2$ b) n^2 c) $4n^2$ d) $3n^2$

29. When two or more substance (elements or compounds) combine to form a single product, the reaction are called

a) oxidation b) combination c) combustion d) reduction

30. Formula of bleaching powder is

a) $CaCl_2$ b) $CaCO_3$ c) $MgCl_2$ d) $CaOCl_2$

31. If the roots of the equation $ax^2+bx+c=0$ are real and of the form $\frac{\alpha}{\alpha-1}$ and $\frac{\alpha+1}{\alpha}$, then the value of $(a+b+c)^2$ is

(a) b^2-4ac (b) b^2-2ac (c) $2b^2-ac$ (d) None of these

32. Which of the following is correct

(a) $\tan 1 > \tan 2$ (b) $\tan 1 = \tan 2$ (c) $\tan 1 < \tan 2$ (d) $\tan 1 = 1$

33. If $p=\frac{2\sin\theta}{1+\cos\theta+\sin\theta}$, and $q=\frac{\cos\theta}{1+\sin\theta}$, then

(a) $pq=1$ (b) $\frac{q}{p}=1$ (c) $q-p=1$ (d) $q+p=1$

34. If $x=\sec\phi-\tan\phi, y=\operatorname{cosec}\phi+\cot\phi$, then

(a) $x=\frac{y+1}{y-1}$ (b) $x=\frac{y-1}{y+1}$ (c) $y=\frac{1-x}{1+x}$ (d) None of these

35. If $\sin(\alpha-\beta)=\frac{1}{2}$ and $\cos(\alpha+\beta)=\frac{1}{2}$, where α and β are positive acute angles, then

(a) $\alpha=45°, \beta=15°$ (b) $\alpha=15°, \beta=45°$ (c) $\alpha=60°, \beta=15°$ (d) None of these

36. $\frac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}}-\frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}}+\frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}}=$

(a) $5\sqrt{2}$ (b) $3\sqrt{2}$ (c) $2\sqrt{3}$ (d) 0

37. If $5^{x-1}+5.(0.2)^{x-2}=26,$ then x may have the value

(a) 25 (b) 10 (c) 3 (d) None of these

38. The cube root of $9\sqrt{3}+11\sqrt{2}$ is

(a) $2\sqrt{3}+\sqrt{2}$ (b) $\sqrt{3}+2\sqrt{2}$ (c) $3\sqrt{3}+\sqrt{2}$ (d) $\sqrt{3}+\sqrt{2}$

39. If the sum of n terms of an A.P. is $nA+n^2B$, where A, B are constants, then its common difference will be

(a) $A-B$ (b) $A+B$ (c) $2A$ (d) $2B$

40.Let T_r be the r^{th} term of an A.P. for $r=1, 2, 3,....$. If for some positive integers m, n we have $T_m=\frac{1}{n}$ and $T_n=\frac{1}{m}$, then T_{mn} equals

(a) $\frac{1}{mn}$ (b) $\frac{1}{m}+\frac{1}{n}$ (c) 1 (d) 0

41.If $a_1, a_2, a_3.....a_n$ are in A.P., where $a_i>0$ for all i, then the value of

$$\frac{1}{\sqrt{a_1}+\sqrt{a_2}}+\frac{1}{\sqrt{a_2}+\sqrt{a_3}}+\ .....\ +\frac{1}{\sqrt{a_{n-1}}+\sqrt{a_n}}=$$

(a) $\frac{n-1}{\sqrt{a_1}+\sqrt{a_n}}$ (b) $\frac{n+1}{\sqrt{a_1}+\sqrt{a_n}}$ (c) $\frac{n-1}{\sqrt{a_1}-\sqrt{a_n}}$ (d) $\frac{n+1}{\sqrt{a_1}-\sqrt{a_n}}$

42.if the radius of a sphere is increased by 50%,find the increase percent in volume and the increase in the surface area.

(a) 125% (b) 50% (c) 75% (d) None

43.The ratio of the areas of the incircle and circumcircle of an equilateral triangle is .

(a) 1:2 (b) 1:3 (c)1:4 (d)1:9

44.P is the point in the interior of an equilateral triangle with side a units.If p_1, p_2 and p_3 are the distance of p from the three sides of the triangle then $p_1+p_2+p_3$:

(a) equals 2a/3 units (b) equals $\frac{a\sqrt{3}}{2}units$

(c) is more than a units (d) cannot be detrmined unless the location of P is specified

45.The sides of a triangle are of length 20,21 and 29 units .The sum of the length of altitudes will be

(a) 1609/29units (b) 49 units (c)1909/21 units (d) 70 units.

46. For transport water Plants have specialized structurers called as...

(a)Leaves (b)meristem (c)Phloem (d) Xylem

47. In case of kidney failure which process is being used ?

(a) dialysis (b)peristalsis (c) epiglottis (d) ELISA

48. Which of the following is not a cold blooded animal ?

(a) pisces (b) amphibians (c) reptiles (d) Aves.

49. Apis mellifera is related to

(a) Bee keeping (b) Pisiculture (c) poultry Farming (d) Sericulture.

50. CFC's are responsible for mainly

(a) Global warming (b) Oxygen Cycle (c) Ozone hole (d) Nitrogen Cycle