

**8<sup>th</sup> AHMED BIN ABOOD MEMORIAL**  
**State Level Physics-Maths Knowledge Test-2018**  
*Organized by*

*Department of Physics*

*Department of Mathematics*

**Milliya Arts, Science and Management Science College, BEED**

**Max. Marks: 50**

**31-01-2018**

**Time: 60 min**

**Instructions:-**

- All the questions carry equal marks.
- Mobile and Calculators are not allowed.
- Student must write his/her names, college name and allotted seat number on the response sheet provided.
- Student must stick the answer in the prescribed response sheet by completely blacken the oval with black/blue pen only.

Incorrect Method



Correct Method



**Section A**

- 1) If the earth completely loses its gravity, then for any body.....  
(a) both mass and weight becomes zero      (b) neither mass nor weight becomes zero  
(c) weight becomes zero but not the mass      (d) mass becomes zero but not the weight
  
- 2) The angular speed of a flywheel is  $3\pi$  rad/s. It is rotating at.....  
(a) 3 rpm      (b) 6 rpm      (c) 90 rpm      (d) 60 rpm
  
- 3) Resonance occurs when ....  
(a) a body vibrates at a frequency lower than its normal frequency.  
(b) a body vibrates at a frequency higher than its normal frequency.  
(c) a body is set into vibrations with its natural frequency of another body vibrating with the same frequency.  
(d) a body is made of the same material as the sound source.
  
- 4) The SI unit of magnetic flux density is.....  
(a) tesla      (b) henry      (c) volt      (d) volt-second
  
- 5) Ampere's circuital law is integral form of.....  
(a) Lenz's law      (b) Faraday's law      (c) Biot-Savart's law      (d) Coulomb's law

- 6) The energy band gap is highest in the case of .....
- (a) metal (b) insulator (c) semiconductor (d) diode
- 7) Cyclotron cannot accelerate.....
- (a) protons (b) neutrons (c) deuterons (d)  $\alpha$ -particles
- 8) At which of the following temperatures the surface tension of water is minimum ?
- (a)  $40^{\circ}\text{C}$  (b)  $10^{\circ}\text{C}$  (c)  $5^{\circ}\text{C}$  (d)  $4^{\circ}\text{C}$
- 9) How much energy will be required if a mass of 100 kg escapes from the earth?  
( $R_e = 6.4 \times 10^6 \text{ m}$ ,  $g = 10 \text{ ms}^{-2}$ )
- (a)  $3.2 \times 10^9 \text{ joule}$  (b)  $6.4 \times 10^9 \text{ joule}$   
(c)  $1.6 \times 10^9 \text{ joule}$  (d)  $8 \times 10^9 \text{ joule}$
- 10) The process of regaining of information from carrier wave at the receiver is called
- (a) modulation (b) transmission (c) propagation (d) demodulation
- 11) The process in which no heat enters or leaves the system is termed as
- (a) isochoric (b) isobaric (c) isothermal (d) adiabatic
- 12) Through which character we can distinguish the light waves from sound waves.
- (a) interference (b) refraction (c) polarization (d) reflection
- 13) If two sources are not coherent then we obtain
- (a) steady interference (b) no interference  
(c) diffused interference (d) diminished interference
- 14) A 700 pf capacitor is charged by a 50 V battery. The electrostatic energy stored by it is
- (a)  $6.7 \times 10^{-7} \text{ J}$  (b)  $8.75 \times 10^{-7} \text{ J}$  (c)  $13.6 \times 10^{-9} \text{ J}$  (d)  $17.0 \times 10^{-8} \text{ J}$
- 15) Kirchhoff's current law is the law of conservation of .....
- (a) energy (b) momentum (c) charge (d) angular momentum
- 16) When a magnetic substance is heated, then
- (a) it becomes a strong magnet (b) it loses its magnetism  
(c) it does not affect the magnetism (d) its susceptibility increases

- 17) The Nobel Prize in Physics for 2017 was awarded to.....  
(a) Pavel Cherenkov, Ilya Frank, Igor Tamm  
(b) Jacques Dubochet, Joachim Frank, Richard Henderson  
(c) Rainer Weiss, Barry Barish, Kip Stephen Thorne  
(d) Donald Arthur Glaser
- 18) Choke coil works on the principle of  
(a) transient current (b) self-induction (c) mutual induction (d) wattles current
- 19) Photoelectric effect was discovered by .... in 1887.  
(a) Hertz (b) Hallwachs (c) Geiter (d) J J Thomson
- 20) The radius of nucleus of an atom is of the order of  
(a)  $10^{-10}$  cm (b)  $10^{-15}$  cm (c)  $10^{-13}$  cm (d)  $10^{-8}$  cm
- 21) Age of a tree is determined by using a radio isotope of  
(a) carbon (b) cobalt (c) iodine (d) phosphorus
- 22) Transistors can work as a switch in  
(a) biasing region (b) cut off region (c) depletion region (d) none of these
- 23) A geo-synchronous satellite  
(a) is located at a height of 34860 km to ensure global change  
(b) appears stationary over a place on earth's magnetic pole  
(c) is not really stationary at all but orbits the earth within 24 hours  
(d) is always at a fixed location in state and simply spins about its own axis
- 24) The layer that absorbs largest proportion of UV rays is  
(a) ozone layer (b) troposphere (c) ionosphere (d) mesosphere
- 25) The production of echo is due to  
(a) rarefaction of sound waves (b) interference of sound waves  
(c) reflection of sound waves (d) refraction of sound waves

## Section B

26) If  $p$  and  $q$  are two prime numbers then LCM ( $p, q$ ) is :

- (a) 1      (b)  $p$       (c)  $q$       (d)  $pq$

27) If  $n$  is any natural number, then which of the following expression ends with zero:

- (a)  $(3 \times 2)^n$       (b)  $(4 \times 3)^n$       (c)  $(2 \times 5)^n$       (d)  $(6 \times 2)^n$

28) If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $5x^2 - 7x + 2$ ,

then sum of their reciprocals is :

- (a)  $\frac{7}{2}$       (b)  $\frac{7}{5}$       (c)  $\frac{2}{5}$       (d)  $\frac{14}{25}$

29) Which of the following is always true ?

- (a) if  $a < b$  then  $a^2 < b^2$       (b)  $a < b$  then  $\frac{1}{a} > \frac{1}{b}$   
(c)  $a < b$  then  $|a| < |b|$       (d) none of these

30) The pair of linear equations  $x - 2y = 0$  and  $3x + 4y = 20$  have :

- (a) one solution      (b) two solutions  
(c) many solutions      (d) no solution

31) How many tangents can a circle have ?

- (a) only one      (b) only two  
(c) only three      (d) infinitely many

32) A sequence is a function whose domain is set of :

- (a) natural numbers      (b) rational numbers  
(c) integers      (d) irrational numbers

33) For  $x \in \mathbb{R}$ , which of the following is not true?

- (a)  $e^x = 1 - \frac{x}{1!} + \frac{x^2}{2!} - \frac{x^3}{3!} + \dots$       (b)  $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$   
(c)  $\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$       (d)  $\tan x = x + \frac{x^3}{3} + \frac{2x^5}{15} + \dots$

34)  $|e^{i0}| = ?$

- (a) 1      (b) -1      (c) 0      (d)  $\infty$

- 35) The roots of the equation  $ax^2 + x + b = 0$  are equal if :
- (a)  $b^2 = 4a$     (b)  $b^2 < 4a$     (c)  $b^2 > 4a$     (d)  $ab = \frac{1}{4}$
- 36) The slope of the X – axis is :
- (a) 1    (b) -1    (c) 0    (d)  $\infty$
- 37) The domain of the function  $y = \sqrt{\frac{1}{x} - 1}$  is :
- (a)  $x \leq 1$     (b)  $0 \leq x \leq 1$     (c)  $0 \leq x < 1$     (d)  $0 < x \leq 1$
- 38) Three persons work independently on a problem . If the respective probabilities that they will solve it are  $\frac{1}{3}$ ,  $\frac{1}{4}$  and  $\frac{1}{5}$  then find the probability that none can solve it :
- (a)  $\frac{1}{2}$     (b)  $\frac{2}{5}$     (c)  $\frac{1}{3}$     (d)  $\frac{2}{3}$
- 39) The distance of the point  $(-2,3)$  from the line  $x - y = 5$  is :
- (a)  $2\sqrt{5}$     (b)  $3\sqrt{5}$     (c)  $5\sqrt{2}$     (d)  $5\sqrt{3}$
- 40) The degree of the differential equation  $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3 + 6y = 0$  is :
- (a) 1    (b) 2    (c) 3    (d) 5
- 41) If  $\sin A = \frac{1}{2}$  and  $\cos B = \frac{1}{\sqrt{2}}$  then value of  $A + B$  is :
- (a)  $30^\circ$     (b)  $45^\circ$     (c)  $75^\circ$     (d)  $15^\circ$
- 42) If  $\bar{i}, \bar{j}, \bar{k}$  are unit vectors, then  $\bar{i} \times (\bar{j} \times \bar{k}) = \dots$
- (a) 1    (b) 0    (c)  $\frac{1}{3}$     (d) 3
- 43) The string of a kite is 100 meters long and it makes an angle of  $60^\circ$  with the horizontal. Then the height of the kite, assuming that there is no slack in the string is :
- (a)  $\sqrt{3}$  m    (b)  $10\sqrt{3}$  cm    (c) 25 m    (d)  $50\sqrt{3}$  m
- 44) If  $y = \cos(ax + b)$  then  $\frac{d^n y}{dx^n} = ?$
- (a)  $a^n \sin\left(ax + b + \frac{n\pi}{2}\right)$     (b)  $a^n \cos\left(ax + b + \frac{n\pi}{2}\right)$
- (c)  $a^n \sin(ax + b + n\pi)$     (d)  $a^n \cos(ax + b + n\pi)$

45) The value of the determinant  $\begin{vmatrix} bc & ac & ab \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix}$  is :

- (a)  $a + b + c$  (b)  $a + b + c - ab$   
(c)  $(a^2 - b^2)(b^2 - c^2)(c^2 - a^2)$  (d)  $a^2 + b^2 + c^2$

46) Let A and B be two matrices such that they commute for any positive integer n

(i)  $AB^n = B^n A$  (ii)  $(AB)^n = A^n B^n$

- (a) only (i) is correct (b) both (i) and (ii) are correct  
(c) only (ii) is correct (d) none of (i) and (ii) is correct

47)  $\int \frac{\tan(\log x)}{x} dx = ?$

- (a)  $\log \cos(\log x)$  (b)  $\log \sec(\log x)$   
(c)  $\log \sin(\log x)$  (d) none of these

48)  $\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n = ?$

- (a) n (b) e (c)  $\infty$  (d) 1

49) If  $\bar{A} \cdot \bar{B} = 0$  and  $\bar{A} \times \bar{C} = 0$ , then angle between  $\bar{B}$  and  $\bar{C}$  is :

- (a)  $90^\circ$  (b)  $135^\circ$  (c)  $45^\circ$  (d)  $0^\circ$

50)  $1^2 + 2^2 + 3^2 + \dots + n^2 = \dots$

- (a)  $\frac{n(n-1)(n+1)}{3}$  (b)  $\frac{n(n+1)(2n+1)}{6}$   
(c)  $\frac{n(n+1)(2n+1)}{3}$  (d)  $\frac{n(n+1)}{2}$