

80/2015

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. When a cylinder is twisted, the internal couple of forces developed within it due to elasticity is called :
(A) elastic couple (B) twisting couple
(C) torsional couple (D) none of these
2. In a diesel engine the working substance is :
(A) Mixture of diesel vapour and air (B) Diesel vapour
(C) Air (D) Petrol
3. When a charged particle moves through magnetic field, the force acting on it is called :
(A) Gravitational force (B) Lorentz force
(C) Dynamic force (D) None of these
4. In electronics, the device used to convert a.c power to d.c power is :
(A) Amplifier (B) Rectifier
(C) Oscillator (D) Transistor
5. In Newton's rings arrangement, the radius of curvature of the lens is 1 m. 10th and 15th dark fringes have diameter 0.45cm and 0.56cm respectively. The wavelength of light used to illuminate is
(A) 5.6×10^7 m (B) 5.6×10^{-7} m
(C) 56×10^{-7} m (D) 56×10^7 m
6. The light is guided in an optical fiber is on the principal of :
(A) Refraction (B) Reflection
(C) Total internal reflection (D) Interference
7. In communication system, the type of modulation which is not widely used in radio and TV transmission is :
(A) Phase Modulation (B) Amplitude Modulation
(C) Frequency Modulation (D) None of these

A

8. The apparent weight of a person in a freely falling elevator is :
(A) Infinity (B) 9.8 Kg
(C) 9.8 gm (D) Zero
9. The existence of which elementary particle was confirmed by the data from Large Hadron Collider LHC in 2012?
(A) Quarks (B) Higgs Boson
(C) Tau Mesons (D) Electron
10. According to Theory of Relativity the time interval measured in a frame moving with very high speed is :
(A) Shorter than proper time (B) Longer than proper time
(C) Equal to proper time (D) None of these
11. The value of velocity of sound in air is :
(A) 3331.6 m/s (B) 333.16 m/s
(C) 33.16 m/s (D) 3.31 m/s
12. In LASERS, if N_1 is number of atoms in ground level and N_2 that in higher energy level, the population inversion is achieved when :
(A) $N_2 > N_1$ (B) $N_1 > N_2$
(C) $N_1 = N_2$ (D) None of these
13. A pencil is viewed through a calcite crystal. Two images are seen. The cause of this phenomenon is :
(A) Diffraction (B) Interference
(C) Double refraction (D) None of these
14. In radioactivity, the radiation which is produced by the transformation of particles in the nucleus is :
(A) Alpha rays (B) Beta rays
(C) Gamma rays (D) Infra red rays
15. The part of electromagnetic radiation with smallest wavelength is :
(A) Radio waves (B) Visible spectrum
(C) X-ray (D) Gamma ray
16. A gaseous plant hormone is :
(A) Auxin (B) Ethylene
(C) Gibberellin (D) Cytokinin

17. Palynology is the study of :
(A) Fossils
(B) Sepals
(C) Palms
(D) Pollen grains
18. When stomata open, guard cells are :
(A) Flaccid
(B) Large
(C) Turgid
(D) Small
19. Histogen theory was proposed by :
(A) Hanstein
(B) Schmidt
(C) Nageli
(D) Haberlandt
20. In Lamiaceae, the androecium is :
(A) Monodynamous
(B) Tetradynamous
(C) Tridynamous
(D) Didynamous
21. A group of organisms which can be a member of Monera or Protista or Plantae :
(A) Cyanobacteria
(B) Algae
(C) Bacteria
(D) Fungi
22. The source of O_2 is liberated in photosynthesis is :
(A) H_2O
(B) CO_2
(C) H_2O_2
(D) Carbohydrate
23. Edible part of mango is :
(A) Epicarp
(B) Endocarp
(C) Mesocarp
(D) Receptacle
24. How many female flowers occur in a cyathodium?
(A) Two
(B) One
(C) Many
(D) Three
25. In angiosperms, functional megaspore develops into :
(A) Ovule
(B) Embryo sac
(C) Pollen sac
(D) Endosperm
26. The endosperm of gymnosperm is :
(A) Haploid
(B) Triploid
(C) Diploid
(D) Polyploid

27. Polyploidy can be induced with the help of :
- (A) IAA (B) Gibberellin
(C) Colchicine (D) Kinetin
28. Algal zone of coralloid root of *Cycas* generally has :
- (A) Green algae (B) Blue-green algae
(C) Red algae (D) Brown algae
29. Agar is extracted from the members of :
- (A) Green algae (B) Brown algae
(C) Blue-green algae (D) Red algae
30. The individual unit of perianth is :
- (A) Tepal (B) Sepal
(C) Petal (D) Anther
31. What is the role of kidney in mammals?
- (A) Removal of water and maintenance of nitrogenous substance
(B) Removal of salt and retention of water
(C) Removal of water and retention of salt
(D) Removal of nitrogenous wastes and maintenance of water levels
32. Hormone Vasopressin helps :
- (A) To increase the amount of water resorbed in the kidney
(B) To increase the amount of glucose resorbed in the kidney
(C) To decrease the amount of water resorbed in the kidney
(D) To decrease the amount of glucose resorbed in the kidney
33. Which of the following statement is correct for a pathogen?
- (A) They are all microscopic (B) They are all infectious
(C) They are all macroparasites (D) They are all viral particles
34. Select the most accepted sequence in human evolution :
- (A) Astralopithecus → Ramapithecus → Homo erectus → Homo habilis → Homo sapiens
(B) Cro-Magnon man → Homo erectus → Homo habilis → Homo sapiens
(C) Astralopithecus → Ramapithecus → Homo erectus → Homo sapiens → Homo habilis
(D) Ramapithecus → Homo habilis → Homo erectus → Homo sapiens

35. Convergent evolution will result in :
- (A) Homologous organs (B) Analogous organs
(C) Vestigial organs (D) Both (A) and (B)
36. Organ transplanted individuals are given drugs to minimize the rejection of transplanted organs. How do these drugs work?
- (A) They act as antibiotics
(B) They act as vaccines
(C) They suppress the immune response in the organ transplanted individual
(D) They promote antibody production in the organ transplanted individual
37. What is the major difference between active and passive transport?
- (A) Active transport takes place in plants; while passive transport takes place in animals
(B) Active transport takes place in animals; while passive transport takes place in plants
(C) Active transport requires energy input; while passive transport does not
(D) Active transport does not use membranes; while passive transport always uses membranes
38. The number of sex chromosomes that a human female can inherit from mother is
- (A) 46 (B) 23
(C) 1 (D) 2
39. T-Lymphocytes are part of :
- (A) Antibody mediated immune response (B) Cell mediated immune response
(C) First line of defense (D) Autoimmunity
40. Sericulture is associated with :
- (A) Termites (B) Aphids
(C) Bombyx (D) Mantis
41. Proteins that are designed to be exported outside of the cell are synthesized on/in :
- (A) Mitochondria (B) Rough Endoplasmic Reticulum
(C) Smooth Endoplasmic reticulum (D) Free Ribosomes
42. Which of the following is our National Animal?
- (A) Panthera tigris (B) Panthera leo
(C) Pava cristatus (D) Canis vulpes

43. Good Ozone is found in :
 (A) Thermosphere (B) Troposphere
 (C) Mesosphere (D) Stratosphere
44. A person with sickle cell anaemia has advantages over the disease :
 (A) Hepatitis (B) Chikunguniya
 (C) Malaria (D) Typhoid
45. Which group of animals belongs to the same phylum?
 (A) Butterfly, Scorpion, Ants
 (B) Hydra, Starfish, Octopus
 (C) Earthworm, Hookworm, Roundworm
 (D) Volvox, Mosquito, Obelia
46. The slope of the curve $y = \frac{1}{x}$ at $x = 1$ equals :
 (A) 2 (B) 4
 (C) -1 (D) 1
47. If f is continuous and $\int_1^2 f(x) dx = -4$ and $\int_1^5 f(x) dx = 6$ then $\int_2^5 f(x) dx =$:
 (A) 5 (B) 10
 (C) 7 (D) 1
48. $\lim_{x \rightarrow 1} \frac{1 - \sqrt{x}}{1 - x}$ is :
 (A) $\frac{1}{2}$ (B) $\frac{1}{3}$
 (C) $\frac{1}{4}$ (D) $\frac{1}{5}$
49. The Parametric form of $x^2 + y^2 = 4$ is :
 (A) $(2 \cos \theta, 2 \sin \theta)$ (B) $(\cos \theta, \sin \theta)$
 (C) $(-\cos \theta, -\sin \theta)$ (D) $(\sin^2 \theta, \cos^2 \theta)$
50. The value of $\sinh^{-1} 1$ using logarithm is :
 (A) $\log(1 + \sqrt{2})$ (B) $\sqrt{3}$
 (C) $\log(\sqrt{2} + \sqrt{3})$ (D) $\log 1$

51. The degree of the differential equation $(y')^2 + y = x^3 - 4$ is :
- (A) 2 (B) 3
(C) 4 (D) 5
52. The order of the largest square sub matrix whose determinant is not zero is called :
- (A) Symmetric (B) Skew symmetric
(C) Rank (D) Null matrix
53. The integrating factor of the differential equation $\frac{dy}{dx} + y \tan x = \frac{x}{3}$:
- (A) $\tan x$ (B) $\cos x$
(C) $\sec x$ (D) $\cot x$
54. Identify the function which when differentiate or integrate is unaltered :
- (A) $\sin x$ (B) $\log x$
(C) e^x (D) \sqrt{x}
55. The value of $\frac{1}{x^{1000}}$ when $x=1$ is :
- (A) 1 (B) 2
(C) $\frac{1}{1000}$ (D) 1000
56. Projection of \vec{a} in the direction of \vec{b} is :
- (A) $\frac{\vec{a} \cdot \vec{b}}{|\vec{b}|}$ (B) $\frac{\vec{a} \times \vec{b}}{|\vec{b}|}$
(C) $\frac{\vec{a}}{|\vec{a}|}$ (D) $\frac{\vec{b}}{|\vec{b}|}$
57. A vector point function f is said to be solenoidal in a region if :
- (A) $\text{div } \vec{f} = 0$ (B) $\text{curl } \vec{f} = 0$
(C) $\nabla^2 \vec{f} = 0$ (D) $\text{grad } \vec{f} = 0$