BRIGHT LEARNERS ORGANIZATION AND CONCOUR PREP SCHOOL

CONTINUOUS ASSESSMENT
WEEK 8

ENGINEERING DEPARTMENT

CONTENT

PHYSICS 25MARKS
MATHEMATICS 25MARK

GOOD LUCK

PHYSICS

1. **Which of the following sets x, y, and z contains two vector quantities and one scalar?**

	X	Y	Z
A	Power	Velocity	E-field
B	Force	Energy	Pressure
C	Weight	Momentum	Displacement
D	Mass	Torque	Temperature

2. Using a steady force of 150 N, a farmer succeeds in pulling horizontally a 20 kg bag of potatoes through 20 m along a flat horizontal pavement. As she does so, she overcomes a frictional force of 50 N. How much work is done on the bag?
A. 1000 J
B. 2000 J
C. 3000 J
D. 4000 J

3. **A ball is thrown vertically upward so that it returns to the thrower. The value of the acceleration of the ball at the highest point reached is**
A. 9.8ms-2 downward
B. 10ms-2 downward
C. 0ms-2
D. 9.8ms-2 upwards

4. **The magnitude of the force, F, between two masses m1 and m2 separated by a distance r is given by the expression** $\boldsymbol{F = G\frac{m_1 m_2}{r^2}}$**, The base units for G are**
A. Kg3m3 s -2
B. Kg-1m3 s -2
C. Kgm3 s -2
D. Kg-1ms-2

5. **In which of the following sets do we have one scalar and two vectors?**
A. Velocity, Pressure, Work
B. Velocity, Force, Acceleration
C. Displacement, Momentum, Power
D. Work, Power, Energy

6. **Suppose that the force on a 1 kg mass on the surface of the earth is 10N and that the radius of the earth is about 600 km. Then the force on an 8 kg mass placed at a point 2000km from the center of the earth will be**
A. 26.7 N
B. 2.67 N
C. 25.0 N
D. 2.50 N

7. **A person jumps from a height of 1m and lands stiff-legged on bare ground. The person's mass is 60 kg and he is travelling at a velocity of 45m/s just prior to hitting the ground. If the person takes 0.05s to land, the force developed** will be
A. 5400 N
B. 54000 N
C. 540 N
D. -5400 N

8. **A set of three quantities in the following sets that are all vectors is**
A. Energy, Power, Weight
B. Torque, Impulse, Field strength
C. Moment, Power, Weight
D. Force, Impulse, Pressure

9. **Which of the sets of quantities x and y vary according to the inverse square law?**

	X	Y
1	Potential due to a point charge	Distance from the point charge
2	Force of attraction between two masses	Distance between the masses
3	The Electric Field due to a point charge	Distance from the point charge

A. 1 and 2
B. 2 and 3
C. 1 only
D. 3 only

10. **Which of the following statements is/are true about Gravitational and electrostatic forces?**
1. They obey an inverse square law
2. They originate from the charge of a body
3. They are all action-at-distance forces
A. 1 and 2

B. 2 and 3
C. 1 only
D. 3 only

11. **Which of the following statements is/are true about oscillatory motion?**
1. In the absence of external forces, the amplitude of oscillation remains constant
2. The maximum amplitude is obtained when the system is at resonance
3. Damping usually gives rise to a decrease in the frequency of oscillation
A. 1 and 2
B. 2 and 3
C. 1 only
D. 3 only

12. **A snooker ball x moving with an initial velocity u, makes an elastic head-on collision with an identical stationary ball y. Which of the sets velocities below correctly gives**
the velocities of x and y after the collision?

	X	Y
A	U/2	U/2
B	U	U
C	U	0
D	0	U

13. **An electron moves in a circular orbit in a uniform magnetic field. Which of the following statements is the most correct?**
A. The period of the electron in the orbit is independent of the speed of the electron
B. The force on the electron is parallel to the field
C. The speed of the electron is independent of the radius of the orbit
D. The B-field is proportional to the radius of the circlet

14. Which of the following deduction is/are true for Newton's first law of motion?
1. A body is in uniform motion only when no force acts on it
2. A resultant force is necessary to cause an object to accelerate
3. The motion of a body in the absence of a net force is rectilinear
A. 1 and 2
B. 2 and 3
C. 1 only
D. 3 only

15. **Which of the following statements about an electron is/are correct?**
1. It sets up only an electric field when it is in motion
2. It sets up both electric and magnetic fields when in motion
3. It sets up only an electric field when stationary
A. 1 and 2
B. 2 and 3
C. 1 only
D. 3 only

16. The force F in a current carrying conductor placed in a uniform magnetic field of strength B is given by
A. $F = BANI$
B. $F = BIL$
C. $F = BIL\sin\theta$
D. $F = BIL\cos\theta$

17. The force in the wire in question 16 above minimum when the wire is ____ to the field
A. Perpendicular
B. At 60°
C. Parallel
D. At 30°

18. A 1N force acts on a wire carrying a current of 2mA and of length 2cm. Calculate strength of the surrounding magnetic field B, given that the wire is perpendicular to the field.
A. 25000T
B. 250T
C. 4T
D. 2500T

19. **Newtons law of universal gravitation states that,**
A. $F \alpha m1m2$ and $F \alpha 1/r^2$
B. $F \alpha m1m2$
C. $F \alpha 1/r^2$
D. $F \alpha m1m2$ or $F \alpha 1/r^2$

20. What is a geosynchronous satellite
A. A satellite that takes 1yrs to make a complete orbit
B. A satellite that takes 1hr to make a complete orbit
C. A satellite that takes 1day to make a complete orbit

D. A satellite that takes 24hrs to rotate on its axis

21. The following are keplers laws except,
A. $T^2 \alpha r^3$
B. The force on a mass due to another mass is inversely proportional to the square of the distance between them
C. Planets swipes out equal distances in equal time
D. The path of planets is in the form of an eclipes with the sun as the parent star

22. A ball is projected with an initial speed of 25m/s at an angle of 60 ° to the vertical, which of the following is true about the ball at maximum height
A. The ball reach maximum velocity
B. The velocity of the ball is 0
C. The acceleration of the ball is 0
D. A is wrong but B and C are correct

23. Calculate the time to reach maximum height(from question 22 above).
A. 1.27s
B. 2.0s
C. 10s
D. 0.1s

24. Displacement is defined as
A. How far 2 points are apart
B. Distance from from a specific direction from a reference point
C. Displacement = Vdt
D. B and C are correct

25. Newtons 2nd law of motion states that
A. F = ma
B. F = mg
C. F = m(dv/dt)
D. All of the above is correct.

26. Two equal masses separated by a distance r attract each other with gravitational force F. If the distance is halved, what happens to F?

a. Halved
b. Doubled
c. Quadrupled
d. Reduced to one fourth
e. Remains same

27. The escape speed from a planet is v_e. If the radius of the planet doubles and mass becomes 8 times, the new escape speed is:

a. $2v_e$
b. $\sqrt{2}v_e$
c. v_e
d. $4v_e$
e. $8v_e$

28. Electric field due to a dipole at axial point is:

a. $\frac{1}{4\pi\varepsilon_0} \cdot \frac{2p}{r^3}$
b. $\frac{1}{4\pi\varepsilon_0} \cdot \frac{p}{r^2}$
c. $\frac{1}{4\pi\varepsilon_0} \cdot \frac{p}{r^3}$
d. Zero
e. Infinite

29. The net electric flux through a closed surface is:

a. Zero always
b. Depends on volume
c. Depends on surface area
d. Equal to charge enclosed divided by ε_0
e. Infinite

30. A proton and an alpha particle enter a magnetic field perpendicular to their velocity. The ratio of their radii is:

a. 1:1
b. 1:2
c. 2:1
d. 1:4
e. 4:1

31. A charged particle moves through an electric field and magnetic field such that net force is zero. Then:

a. $v = E/B$
b. $v = EB$
c. $v = B/E$
d. $v = 0$
e. $v = 1$

32. The energy stored in a 5 μF capacitor charged to 200 V is:

a. 0.1 J
b. 0.5 J
c. 0.2 J
d. 0.05 J
e. 0.025 J

33. Capacitance of a parallel plate capacitor increases when:

a. Plate area decreases
b. Plate separation increases
c. Dielectric constant increases

d. Potential difference increases
e. None of the above

34. Electric potential inside a charged conducting sphere:

a. Zero
b. Inversely proportional to radius
c. Constant
d. Proportional to r
e. Depends on field

35. An electric dipole in a uniform field experiences:

a. No force or torque
b. A net force only
c. A torque only
d. Both force and torque
e. Only displacement

36. Drift velocity increases when:

a. Electric field decreases
b. Cross-sectional area increases
c. Electron density decreases
d. Temperature increases
e. Electric field increases

37. Ohm's law fails for:

a. Resistors
b. Electrolytes
c. Vacuum tubes
d. Semiconductors
e. All of the above

38. Two wires have same length but different cross-sectional areas. Resistance is:

a. Greater in thicker wire
b. Same
c. Greater in thinner wire
d. Zero
e. Depends on voltage

39. Potential difference across a wire carrying current is 5 V and its resistance is 10 Ω. Power dissipated?

a. 0.5 W
b. 1 W
c. 2.5 W
d. 5 W
e. 10 W

40. Energy stored in magnetic field of an inductor is:

a. $\frac{1}{2}CV^2$
b. $\frac{1}{2}LI^2$
c. $\frac{1}{2}mv^2$
d. LI
e. CV

41. Two parallel wires carry equal current in same direction. Force between them is:

a. Zero
b. Repulsive
c. Attractive
d. Rotational
e. Inverse

42. Lenz's law is based on:

a. Conservation of charge
b. Conservation of mass
c. Conservation of energy
d. Newton's second law
e. Ohm's law

43. A magnetic field of 2 T exists over an area of 0.5 m². What is the flux?

a. 1 Wb
b. 0.5 Wb
c. 2 Wb
d. 4 Wb
e. 0.25 Wb

44. In a transformer, ratio of primary to secondary turns is 5:1. If primary voltage is 1000 V, secondary is:

a. 100 V
b. 200 V
c. 250 V
d. 500 V
e. 1000 V

45. A 1000 W heater runs for 2 hours. Energy consumed in kWh?

a. 1 kWh
b. 2 kWh
c. 0.5 kWh
d. 5 kWh
e. 10 kWh

46. Which quantity is conserved in an inelastic collision?

a. Kinetic energy
b. Momentum
c. Angular momentum
d. Energy and momentum
e. None

47. Unit of magnetic permeability is:

a. H
b. H/m
c. T
d. Wb
e. N/A

1. Cyclotron is used to:

a. Detect radiation
b. Measure force
c. Accelerate charged particles
d. Measure mass

e. Create magnetic fields

48. The unit of electric flux is:

a. C
b. V
c. Nm^2/C
d. Nm/C
e. J

49. The current density J is related to electric field E by:

a. $J = \rho E$
b. $J = \sigma E$
c. $J = E/\rho$
d. $J = qE$
e. $J = \varepsilon E$