KURDISTAN REGION GOVERNMENT -IRAQ   IN THE NAME OF ALLAH   Time:3:30 hours
fingerprint
MINISTRY OF EDUCATION
HIGH COMMITTEE OF THE GENERAL EXAMINATION
General Examinations for Preparatory Stage \ 1ˢᵗ Attempt
Academic year (2022-2023)   (Grade twelve scientific)   **Sub: Physics**
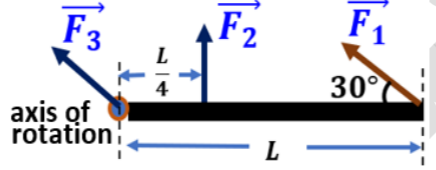
Choose the right answers for the following questions: (two marks for each question)

1. A car's tire rotates at an initial angular speed of 21.5 rad/s. The driver accelerates, and after 6.5 s the tire's angular speed is 28 rad/s. What is the tire's average angular acceleration during the 6.5 s time interval?
A) 1 rad/s² **B)** 3 rad/s² **C)** 1.9 rad/s² **D)** 3.5 rad/s²

2. Find the magnitude of the gravitational force a 71.2 kg person would experience while standing on the surface of planet Earth $\left[G = 6.673 \times 10^{-11} \frac{N.m^2}{kg^2} \right]$
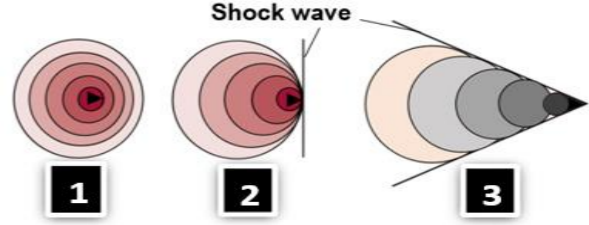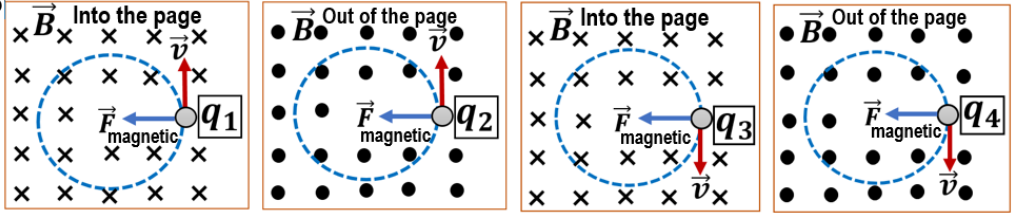
m $_{Earth}$	r $_{Earth}$
5.98×10^{24} kg	6.37×10^6 m

A) 6.64 N **B)** 66.4 N **C)** 664 N **D)** 700 N

3. How many (rad) are equal (35°):   **A)** 1.3 rad   **B)** 31 rad   **C)** 0.61 rad   **D)** 6.3 rad

4. The angle between direction of centripetal force $(\vec{F_c})$ and direction of tangential speed $(\vec{v_t})$ is:
A) 180° **B)** 0° **C)** 30° **D)** 90°

5. (Car moves in a circular at a constant speed) which of the following is true of motion of the car?
A) It has tangential acceleration but no centripetal acceleration
B) It has centripetal acceleration but no tangential acceleration.
C) It has both centripetal acceleration and tangential acceleration.
D) It doesn't have tangential acceleration and centripetal acceleration

6. (A car moving around a flat circular track). Identify the force that maintains the circular motion?
A) The friction force between tires and the road **B)** Total weight of car
C) The normal force of the road on the car **D)** None of them

7. The three forces acting on the rod have equal magnitudes $(F_1 = F_2 = F_3 = 10$ N) as shown in figure which of the forces produce greatest torque on the rod about the axis at the left end of the rod?[If $L = 1\ m$]
A) $\vec{F_2}$ **B)** $\vec{F_1}$
C) $\vec{F_3}$ **D)** Each force will produce the same torque

8. (Two sold spheres of different diameters and different masses) have the same moment of inertia, If the diameter of second sphere is half of diameter of first sphere and the mass of second sphere is …………the mass of first sphere   **A)** half **B)** twice **C)** four times **D)** three times

9. A solid ball starts from rest at the top of an incline 3.5 m in height. Find the translational speed of the ball after it has rolled to the bottom of the incline.
A) 5 m/s **B)** 3.5 m/s **C)** 1.57 m/s **D)** 7 m/s

10. A man of weight 720 N stands on a light board of length 2 m that is fixed on two supports at its extremities. If the distance between the point where the man stands and the first support is 0.5 m, what is the force exerted by the second support on the board?
A) 180 N **B)** 280 N **C)** 400 N **D)** 750 N

11. Ice skaters use the principle of conservation of angular momentum to produce high-speed spins, if the skaters' moment of inertia decreased to half, by what factor does its rotational kinetic energy change?
A) $\frac{1}{2}$ **B)** 2 **C)** 4 **D)** $\frac{1}{4}$

12. A force of 12 N is applied tangentially to a disk of radius 0.2 m. if the angular acceleration of disc is 4 rad/s² what is the moment of inertia of the disk?
A) 0.6 Kg.m² **B)** 6 Kg.m² **C)** 1.2 Kg.m² **D)** 12 Kg.m²

13. Which letter on the graph is used for wave amplitude?
**A)** A **B)** B
C) C **D)** D
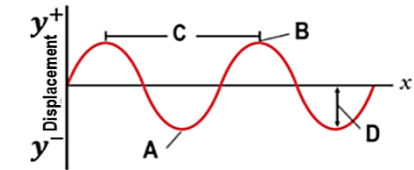
14. Two tuning forks are struck the first produces a sound with a frequency of 285 Hz with a wavelength of 1.2 m and the second fork produces a sound a frequency of 570 Hz what is the wavelength of sound produced by the second fork? (If the two sounds are in the air)
A) 2.4 m **B)** 0.6 m **C)** 0.3 m **D)** 12 m

15. A pendulum bob is made with a ball filled with water. if a hole in the ball allowed water to slowly leak out which of the following is true: **A)** The frequency pendulum will increase **B)** The frequency does not change **C)** The period pendulum does not change **D)** both (B and C) are correct

16. Two waves have the same wave length and amplitude interfere constructively if the amplitude of the resultant wave is 38 cm what is the amplitude of each wave?   **A)** 16 cm **B)** 19 cm **C)** 8 cm **D)** 18 cm

17. $\omega C = $ ....:   **A)** X_C **B)** $\frac{1}{X_C}$ **C)** $2\pi f$ **D)** $\frac{2\pi f}{c}$

18. A simple pendulum is moving with simple harmonic motion disregarding friction and air resistance which of the following remains constant for the bob pendulum along the oscillating motion?
A) gravitational potential energy **B)** kinetic energy **C)** restoring force **D)** total mechanical energy

19. Which of the following is true for (audible waves, Infrasonic waves and Ultrasonic waves) in the same medium?
A) $\lambda_{audiable} < \lambda_{ultrasonic}$ **B)** $f_{audiable} < f_{Infrasonic}$
C) $\lambda_{audiable} = \lambda_{ultrasonic}$ **D)** $f_{audiable} > f_{Infrasonic}$

20. A Formula One " race car's " moves with respect to observer if the observer hears the sound of its engine with a 20% reduction of its original frequency, which of the following is correct?
A) The observer and car are at rest with respect to each other **B)** The observer is moving toward car
C) The car is moving toward observer **D)** The car is moving away from observer

21. Which figure indicate that the speed of the plane attains the speed of sound?
A) 1 **B)** 2
C) 3 **D)** (1 and 3)

22. If the longest wavelength of standing wave of pipe open at both ends is 4.5 m what will be the longest wavelength of that pipe when one end is closed?
A) 9 m **B)** 4.25 m **C)** 18 m **D)** 2.125 m

23. A baseball coach shouts loudly at an umpire standing 5 m away. if the sound power produced by the coach is $\pi \times 10^{-3}$ W, what is the decibel level of the sound when it reaches the umpire?
A) 0 dB **B)** 30 dB **C)** 40 dB **D)** 70 dB

24. Suppose that q_1 , q_2 , q_3 , q_4 four charges, each is moving in a circular path in a magnetic field, as in the figures which of them is positive charges?
A) q_1 and q_4
B) q_2 and q_4
C) q_1 and q_3
D) q_2 and q_3

25. An electric current travers a one loop circular coil of diameter 50 cm. Calculate the intensity of the current if the magnitude of the magnetic field at the center of the coil is $4\pi \times 10^{-5}$T [$\mu_o = 4\pi \times 10^{-7}$ T.m/A]

A) 10 A   **B)** 20 A   **C)** 50 A   **D)** 30 A

26. $\frac{N.s}{C.m}$ =............:   **A)** T   **B)** V   **C)** H   **D)** Wb

27. A straight segment of wire has a length of 25 cm and carries a current of 5 A, If the wire is perpendicular to a magnetic field of 0.6 T, what is the magnitude of the magnetic force on this segment of the wire?

A) 0.075 N   **B)** 7.5N   **C)** 0.75 N   **D)** 75 N

28. A.....................measure very low current of orders (mA) or (µA)

A) Motor   **B)** Transformer   **C)** Galvanometer   **D)** Loudspeaker

29. Which of the following equations used to measure the strength of magnetic field due to a direct current on axis of solenoid?

A) $B = \frac{\mu N I}{r}$ **B)** $B = \frac{\mu N I}{l}$ **C)** $B = \frac{\mu I}{2\pi d}$ **D)** $B = \frac{\mu N I}{2}$

30. In the corresponding figure calculate the conversion ratio of the transformer, and what type of transformer is it?

A) $\left(\frac{1}{30}\right)$ step -up transformer   **B)** $\left(\frac{30}{1}\right)$ step -up transformer

C) $\left(\frac{1}{30}\right)$ step - down transformer   **D)** $\left(\frac{30}{1}\right)$ step - down transformer
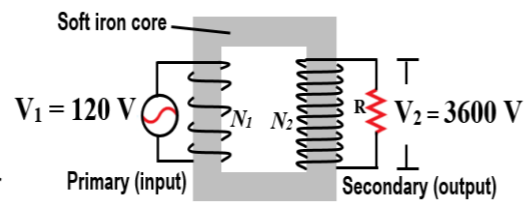
31. A power station sends power to a city. If the transfer efficiency is 0.95 what is the power sent if power lost in conducting wires 50 Kw?   **A)** 1 MW   **B)** 5 MW   **C)** 5 KW   **D)** 1 KW

32. Lenz's law determines which of the following:

A) magnitude of induced current   **B)** magnitude of induced (ε)

C) direction of an induced current   **D)** all answers are correct

33. The symbol (M) in this equation $\left[\varepsilon_2 = -M\left(\frac{\Delta I}{\Delta t}\right)_1\right]$ is called:

A) Mass   **B)** Coefficient of mutual induction

C) Magnetic permeability of the medium   **D)** Constant of universal gravitation

34. A generator coil has 40 turns and an area of 0.3 m² is rotating in uniform magnetic field of strength 0.029 T. The loop's axis of rotation is perpendicular to a uniform magnetic field, the maximum emf induced is 120 V, what is the frequency?   **A)** 100 Hz   **B)** 55 Hz   **C)** 314 Hz   **D)** 628 Hz

35. A generator with a maximum output emf of 205 V is connected to 115 Ω resistor. Calculate the rms current through the resistor.

A) 1.78 A   **B)** 1.26 A   **C)** 0.707 A   **D)** 145 A

36. AC circuit made up of resistor, a self-inductor, and capacitor all are connected in series, what is the angle of phase difference between current and total potential difference if the circuit to resonates?

A) 90°   **B)** 45 °   **C)** 0°   **D)** 180 °

37. A 0.75 kg mass attached to a vertical spring stretches the spring 0.3 m What is the spring constant?

A) 24.52 N/m   **B)** 2666 N/m   **C)** 1990 N/m   **D)** 2700 N/m

38. Which of the following is not a component of a DC electric generator?

A) magnet   **B)** two brushes   **C)** Commutator   **D)** two slip rings

39. A coil of self-inductance L = 50 mH is traversed by a current of intensity 2A under a direct potential difference of 20 V. what is the self impedance (X_L) of coil?

A) 0   **B)** 10 Ω   **C)** 20 Ω   **D)** 40 Ω

40. Light falls on two slits spaced 0.33 mm apart. If the angle between the first dark fringe and the central maximum is 0.055° what is the wavelength of the light?

A) 7.5×10^{-7} m   **B)** 3.52×10^{-7} m   **C)** 6.3×10^{-7}m   **D)** 5.66×10^{-9} m

41. If a double- slit experiment were performed under-water how would the observed interference (light) pattern be affected? Why?   **A)** θ would decrease because λ is longer in water compared to the air

B) θ would increase because λ is shorter in water compared to the air

C) θ would increase because λ is longer in water compared to the air

D) θ would decrease because λ is shorter in water compared to the air

42. Which of the following determines the wavelength of the light produced by the laser?

A) The composition of the active medium   **B)** fully reflecting mirror

C) partially reflecting mirror   **D)** (B and C) are correct

43. If the distance between two lines in diffraction grating is 2 µm Calculate the number of lines per centimeter on this diffraction grating.   **A)** 5000 lines/cm   **B)** 500 lines/cm   **C)** 50000 lines/cm   **D)** 500000 lines/cm

44. Light of frequency of 1 x 10¹⁵ Hz illuminates a sodium surface. The ejected photoelectrons are found to have a maximum kinetic energy of 1.78 eV. Find the threshold frequency for this metal? ($h = 6.63 \times 10^{-34}$ J. s)

A) 4.5×10^{14} Hz   **B)** 3.5×10^{14} Hz   **C)** 5.7×10^{14} Hz   **D)** 2.5×10^{14} Hz

45. Which of the following summarizes Rutherford's model of the atom?

A) Atoms are hard, uniform, indestructible spheres.

B) Electrons are embedded in a sphere of positive charge.

C) Electrons orbit the nucleus in the same way that planets orbit the sun.

D) Electrons exist only at discrete energy levels

46. A photon in a laboratory experiment has an energy of 5 eV. what is the frequency of this photon?($h = 6.63 \times 10^{-34}$ J. s)

A) 1.2×10^{14} Hz   **B)** 1.5×10^{14} Hz   **C)** 1.2×10^{15} Hz   **D)** 2.5×10^{14} Hz

47. The (emitter- base) junction of transistor is ....biased:

A) forward   **B)** reverse   **C)** forward and reverse   **D)** All answers are correct

48. (An increase in the wavelength of the photon scattered by an electron relative to the wavelength of the incident photon) It's called:

A) Ultraviolet catastrophe   **B)** Compton Shift   **C)** Doppler effect   **D)** Black body radiation

49. The p-n junction is the contact between a p-type semiconductor and an n- type semiconductor, generates a (Ddepletion region) from the movement of charge carriers across the p-n junction. Which of the following is correct?
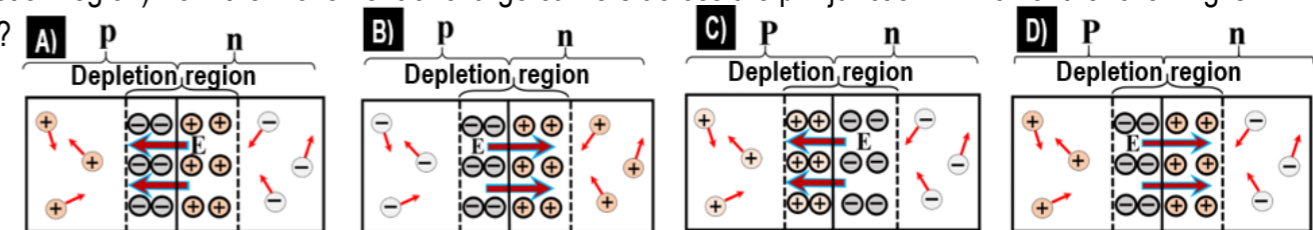
50. Which of the following is likely to be able to move and conduct electricity?

A) an electron in the innermost shell of a copper atom   **B)** a valence electron in a copper atom in a wire

C) an electron in the conduction band of the semiconductor germanium   **D)** Both (B) and (C) are correct