WHITE FARADAY REVISION classes
ON PHY101. 400 QUESTIONS FOR 2021
LIKELY EXAM QUESTIONS

1) [illegible] T^2 (c)10^5dynes (d)None.

2) Convert 80km/h to S.I unit (a) 20mls (b)22.2mls (c)800m/s (d)10m/s.

3) The suffix 10^{-6}, 10^{-9}, 10^{-12} and 10^{-15} is called (a)Micro, nano, pico, atto (b)micro, nano, pico, femto (c) micro, mega, axa (d) None.

4) The suffix 10^3, 10^6, 10^{-18}, 10^9, 10^{12} are _____,_____,_____,_____,_____

5) Classify the following into fundamental and derived quantities acceleration, force, time, velocity, temperature, current, Amount of a substance, luminous intensity, mass, length, volume, radius and density.

6) The first international standard of length was a bar of platinum iridium alloy called the (a)standard length (b) standard meter (c)standard width (d)None.

7) List the dimension of the followings: velocity, force, work, energy, tension, linear momentum, torque, angle, density, pressure, action, power, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____.

8) Which of the following is dimensionless (a)Angle (b) specific gravity (c)tensile strain (d) Refractive index (e) All of the above.

9) The force between the sum of mass M and the earth of mass M separated by a distance, r is given by $F = GMm/r^2$. Use dimensional Analysis to obtain the dimension of G.

10) If $(P + a/v_2)(v-b) = RT$ is an equation of gas where P = pressure, v = volume R = gas constant and T is temperature find the dimension of the constant a and b (a)ML^2T^{-3} and LT^2 (b) ML^5T^2 and ML^2T^{-1} (c)ML^5T^2 and L^2 (d)ML^5T^1 and L^3.

11) I watt is equivalent to (a) 10^5erg^{-1} (b) 10^3erg^{-2} (c) 10^7erg^{-1} (d)None.

12) From question no 10, determine the dimension of the ratio b/a and hence obtain the unit _____, _____

13) The displacement of a particle is given by $S = A + Bt + Ct^2$ deduce the value of the constants A, B and C.

14) Using the theory of dimensions, determine the dimension of q in the formula $(f-q/v)RP = T$ where f is force, V is velocity (a)$ML^{-1}T^{-2}$ (b)MLT^{-2} (c)$ML^{-2}T^3$ (d)ML^2T^{-3} (e) None.

15) A simple pendulum made up of a small mass m suspended from a long thread of length L is set into oscillation. If the period T of the oscillation is related to M, L and the acceleration due to gravity, g by the equation $T = KM^xL^yg^z$ use dimensional analysis to obtain the value of x, y and ∄ and hence find an explicit expression for T _____ and _____

16) Classify the following into vectors and scalars velocity, acceleration, distance, speed, torque, mass, volume, force, moment, density, electric field, electric potential, angular momentum, moment of inertia, young's modulus, coefficient of viscosity, time, temperature, current, displacement.

17) Which of the following pairs has one scalar and one vector quantity(a) Displacement, acceleration (b) potential energy, work (c) speed, power (d)velocity, linear momentum (e) Kinetic energy, force.

18) The principle which state that a vector can be transferred from its line of action to another line of action parallel to the first line is called (a)Transfer vector principle (b) waveman action at a point (c) transmissibdity of vector (d) principle of vector transition.

19) One of the following is a scalar quantity (a)Torque (b)Gravitational field (c) electric potential.

20) Which of the following physical quantity is not fundamental quantity (a)Temperature (b) length (c) current (d)Luminous intensity (e)Electric charge.

21) To sum up two vector, they must (a) Be parallel and opposite direction (b) Be perpendicular and the same direction (c) be parallel and the same direction (d) be parallel and adjacent (e) None.

22) If a vector A = 2i – 3j + k, calculate the unit vector in the direction of A
(a) $\frac{1}{\sqrt{14}}$ (2i-2j+k) (b) $\frac{1}{\sqrt{14}}$ (2i+2j+k)
(c) $\frac{1}{\sqrt{14}}$ (3i+2j-k) (d) $\frac{1}{\sqrt{14}}$ (i+j+k) (e) None.

23) Any vector were the magnitude or size is one is called (a)Unit vector (b) column vector (c) row vector (d) size vector (e) None.

24) If two or more vectors have the same unit vector, such vectors are one and the same thing except in (a) direction (b) position (c) magnitude (d)direction cosine (e) None.

25) Calculate the unit vector in the direction of r = 2i + 2j + 5k
(a) $\frac{1}{\sqrt{33}}$ (i2j+5k) (b) $\frac{1}{\sqrt{33}}$ (2i+2j+5k)
(c) $\frac{1}{\sqrt{33}}$ (i+j+k) (d) $\frac{1}{\sqrt{33}}$ (2i+2j+5k).

26) If A = 3i – 4j + 0k, B = 2i + 3j + 2k and C = 4i + 2j – k find A - 2B+C (a) 2i-8j-5k (b) 3i + 8j – 5k (c)3i-8j – 5k (d) 2i-8j+5k (e) None.

27) Find the vector sum of the three vectors a = 3i-2j+7k, b = i+3k, c = -5k

28) If A = 3i – 4j + 2k find the magnitude of A? Ans _____

29) If A = 3i – 4j + 0k, B = 2i + 3j + 2k and C = 4i + 2j – k find the magnitude of A – 2b+c (a) 10 (b) 5.2 (c) 3.4 (d) 9.9 (e) None.

30) If A = 4i + 2j + 0k and B = 3i – j + 5k obtain a vector C=2A – 3B (a)i_7j-15k (b) 2i+7j-5k (c) -2i+3j+k (d) –i+7j-15k (e) None.

31) A particle is under the action of the following forces given in terms of their components f_1 = 2i+6j-k, f_2 = 4i+2j+5k, f_3=7i-4j-3k and f_4 5i-2j-3k find the resultant forces on the particle also find the magnitude of the resultant Ans_____ and _____

32) The displacement vector from the position P1 (2,4,-5) to P2 (4,3,2) is (a) 5.2 unit (b) 3.2 unit (c) 7.3 unit (d) 8.4 unit (e) none.

33) Find the direction cosine of the vector A = 2i + 4j – 4k (a) $^2/_6$, $^4/_6$, $^{-4}/_6$ (b) $^2/_6$, $^1/_6$, (c) ½, $^3/_2$, $^5/_2$, (d) $^1/_3$, $^2/_3$, ¾ (e) None.

34) Find the direction cosine of the vector r = i-2j-2k (a) $^1/_3$, $^2/_3$, $^{-2}/_3$ (b) $^1/_3$, $^{-2}/_3$, $^2/_3$ (c)$^{-1}/_3$, $^2/_3$, $^{-2}/_3$ (d) $^1/_3$, $^1/_2$, $^3/_2$ (e) None.

35) If A = 2i + 5j – 3k and B = 3i – j + 2k find A.B (a) 3 (b) -2 (c)-5 (d)10 (e) None.

36) If A = 2i – 3j + 4k, b = i+2j – 3k, C = - 3i + 6j – 4k find (a+b) C (a) -20 (b)25 (c) -19 (d) 35 (e) None.

37) If two forces are given in terms of their component as follows f_1 = (3i + 4j – 2k) N and f_2 = (2i + 5j – 6k) N find the following: (i) $f_1 + f_2$ (ii) f_1 . f2 (iii) $f_1 x f_2$.

38) If A = 2i + 5j – 3k and B = 3i – j + 2k find A x B (a)7i+13j +17k (b)7i-13j-17k (c) -7i+13j+17k (d) 7i-j+k (e) None.

39) If A = 3i + 2j + k and B = 4i + 3j – 2k find A x B (a) 8i+2j + k (b) -7i+10j+k (c)2i+8j+k (d) 7i+10j+k (e) None.

40) Given two vectors A = 2i + 5j – 3k and B = 3i – j + 2k find the angle between A and B (a)88.4^0 (b) 32^0 (c) 77.48^0 (d) 87.58^0 (e) None.

41) The angle between two vectors A and B for dot product is given by (a)/AB/Cosθ (b) /B/Cosθ = A.B (c) /A/B/Cosθ = A.B (d) /A/B/Cosθ = AxB (e) none.

42) For what value of "a" are the vectors A = 3i + 2j – 4k and B = 2i+aj+5k perpendicular (a) 2 (b) 7 (c)8 (d) 5 (e) None.

43) Given two vectors A = 6i – 3j + k and B = 2i – j + 2k find the cross product of A and B (a) -5i-10j (b) -5i-10j-k (c) 5i – 10j (d) 10i – 6j + k. (e)5i+10k+ k.

44) Given two vectors A = 4i + 3j and B = 5i – 2j find the magnitude of the vector difference A-B (a) –i-5j (b) i-5j (c) 5 (d) -5.0 (e) 5.1.

45) Find the value of x that will make these two vectors a = 2i+xj_5k and b =3i-4j-2k to be perpendicular for each other (a)2 (b) 1 (c) 3 (d) 4 (e)5.

46) If a vector D = 2i – j + 2k, what is the value of "a" that will make the vector E parallel to D where KE = 8i – 4j + ak (a)8 (b) 4 (c) 3 (d) 10 (e) None.

47) What is the angle between the vector F = 4i + 3j + 5k and the y – axis (a) 28.3^0 (b) 350^0 (c) 45^0 (d) 64.9^0 (e) None.

48) Find the workdone by a force F = 3i + 3j – 6k through a distance r = 4i + 5j + 4k (a)5j (b) 3j (c) 2j (d) 2oj (e) None.

49) Given that an object is moved by a force of F = 3i + 6j + 4k through a displacement of x = 2i + 4j + 3k, find the workdone (a)42j (b)72j (c)30j (d) 150j (e) 36j.

50) If at position r = i + 2j + 3k, a particle is acted upon by a force F = 4i + 5j + 6k, the torque experienced by the particle is (a)32.1N (b) 7.30N (c)4i+10j + 18k (d) 8.01N (e) 15i+10j + 18k.

51) Calculate the area of a parallelogram with A and B as adjacent sides where A = 4i + 5j + 2k and B - 2i+3j+4k (a)40.2 unit (b) 50.2 unit (c)32.86 unit (d) 42.48 unit (e) None.

52) Calculate the moment of the force f, about 0 from a position vector r, if F = (3i+4j +5k)N and r = (6i + 5j+3k)m (a)13i+21j-9k (b)26.29Nm (c)35.29Nm (d) (18i+20j-5k)Nm (e) None.

53) Calculate the moment of the force f = 8i – 4j + 3k about the point 0 (2i +0j+k) if the force is applied at the point P(6i+2j+3k) Ans 14i + 4j – 32k or 35.2Nm.

54) Starting from a given point, a car travels east 84km and then turns due south for another 193km. determine the displacement of the stopped car from it's starting point (a)173.76km (b)210.49km (c) 259.29km (d)210.49m (e) 259.29m.

55) Find the direction of a vector B which covers 8

unit in X direction and 7 unit in y direction Ans _____

56) A vector of magnitude, 8 units, points due east and another vector B of magnitude, 12 units points in the direction $N20^0E$ what is the resultant of the two vectors (a) 14.42 unit (b)15.52 unit (c) 13.24 unit (d)4.93 unit (e) 16.54.

57) An aircraft travelled from calabar to Kano as follows: It first flew to Ilorin covering a distance of 300km at 30^0 west of North and then flew 400km 60^0 East of North to Kano. What is the resultant displacement? (a)500km, $N23.1^0E$ (b)400km, $N53.1^0C$ (c) 30^0km, E 30^0N (d) 800km, E 53.1^0N (e)700km, N 90^0E.

58) Three forces of magnitude 10N, 4N, and 3N act on a body in the direction North, South and East respectively find the magnitude and direction of the resultant force (a)6.7N, 27^0 East of North (b) 56N, 27^0 East of N (c)6.7N, 36^0 East of N (d) 25N, 27^0 East of North (e) None.

59) A body is being pulled by the action of two forces 6N North and 8N Northwest. If the ropes makes angle 50^0 with each other, calculate the resultant force on the body and the direction, it will tend to move Ans12.72N, 288^0Nw.

60) If $A = 2x^2yi + 6x^2y^2j + 4y^2xzk$ calculate Div A at P (2,1,3) (a)50 (b)25 (c)49 (d) 88 (e) None.

61) If a vector $A = 4x^2y^2i - 3x^2yzj + 2y\not{z}^3 k$ find Div A at point (x, y, z) = (1,2,-1) (a)79 (b) 89 (c) 69 (d) 59 (e) None.

62) One of the following options best express the acceleration during simple harmonic motion (a)$a=-wy^2$ (b) $a \neq w^2y$ (c) $a =-w^2y$ (d) $a=w^2y$.

63) One of the following is a vector quantity (a)gravitational field (b)potential energy (c) heat (d) moment (e) None.

64) One of the following relations is the general statement of simple harmonic motion (a)$a=a^2w$ (b) $-a = yw^2$ (c) $a=w^2y$ (d) $a=w^2v$ (e)None.

65) The acceleration of a body executing simple harmonic motion depends on the displacement of the body from its equilibrium position as shown (a) $a \propto y$ (b) $a \propto y\text{-}1$ (c) $a \propto -w^2$ (d) $x \propto -y$.

66) The equation connecting linear velocity and angular velocity of a simple harmonic motion is (a) v=wr (b) $v= {}^w/_r$ (c) w=vr (d) v=-wr.

67) One of the following is a scalar quantity (a) Electric field (b)Angular Momentum (c) gravitational potential (d) Torque (e)None.

68) The equation connecting instantaneous linear velocity and angular velocity of a simple harmonic motion is (a) V= -wrcosθ (b) w=Vrcosθ (c)$V=\frac{w}{r}\cos\theta$ (d) V=wrcosθ.

69) The velocity of a body undergoing simple harmonic motion is given by (a) v = wrcosθ (b) w=Vrcosθ (c) $v= \frac{w}{r}\cos\theta$ (d) v = wrcosθ

70) The simple harmonic motion, velocity can be described according to one of the equation (a)$V_y = w\sqrt{r^2-y^2}$ (b) $Vy = \sqrt{w^2-y^2}$ (c) $Vy = \sqrt{\theta^2-y^2}$ (d)$Vy = w\sqrt{y^2-r^2}$ (e) None.

71) The equation connecting instantaneous linear velocity and angular velocity of an object executing S.H.M is given as (a)$V = w\sqrt{r^2-y^2}$ (b)$V =\sqrt{w^2r^2}$ (c) $Vy = \sqrt{r^2-y^2}$ (d)$wy = w\sqrt{y^2-r^2}$ (e) None.

72) In one cycle of oscillation, the angular velocity may be stated as (a)$w=\frac{d}{T}$ (b) $w=\frac{2}{T}$ (c) $w = \frac{2^{\ 2}}{T}$ (d) None.

73) In one cycle of oscillation, the angular velocity may be stated as (a)$w = {}^d/_t$ (b) $w = 2\ {}^2f$ (c) $w = 2\ f$ (d) w = Vr (e) None.

74) The acceleration of a body undergoing S.H.M is

(a) $a=w^2r\sin\theta$ (b) $a=-wr\sin\theta$ (c) $a = -w^2\cos\theta$ (d) $a = wr$ (e) None.

75) When $V_y = wr$ ie $v = wr$ the velocity is (a) tangential (b) zero (c) min (d) None.

76) At minimum displacement (ie at y=0) during simple harmonic motion, velocity becomes (a)$V_y = -w^2r$ (b) $V_y = r^2w$ (c) $V_y = w^2r$ (d) $V_y = wr$.

77) During simple harmonic motion, when the displacement is maximum, the velocity becomes (a) Maximum (b) minimum (c) half of the max value (d) two times the maximum value.

78) During S.H.M when the amplitude is equal to the displacement the velocity becomes (a)min (b) max (c) half (d) half (d) half of the max (e) none.

79) The value of potential energy at minimum displacement during simple harmonic motion is (a)remains constant (b) maximum (c)minimum (d)half the max value.

80) When the kinetic energy is zero oscillation, the potential energy become (a) maximum (b) minimum (c) half of the total value (d) 1/3 of the total value.

81) At maximum displacement, the instantaneous linear velocity during SHM is (a) min (b) max (c) remains constant (d) half the value.

82) Please to all my students use this formular to remember all these in exam hall

P_{max} a_{max} y_{max} mr V_{min} $\sqrt{K_{min}}$

P_{min} a_{min} y_{min} Mr V K

83) During simple harmonic motion, when the angle θ is minimum, the acceleration becomes (a) maximum (b) minimum (c) half of the max (d) two times the max value.

84) The period of a simple pendulum undergoing simple harmonic motion is given as (a) $T = 2\sqrt{L}$ (b) $T=2\sqrt{mgh}$ (c) $T = 2\sqrt{L/g}$ (d) $T = 2\sqrt{g/k}$.

85) The period of an oscillating simple pendulum depends on
(a) $\sqrt{m^{-1}}$ (b) $\sqrt{L^{-1}}$ (c) $\sqrt{L}$ (d) $\sqrt{m}$

86) The physical significance of the period of an oscillating simple pendulum is (a) $T \propto \sqrt{L}$ (b) $T \propto \sqrt{L^{-1}}$ (c) $T \propto \sqrt{m}$ (d) $T \propto \sqrt{k}$

87) The equation of motion of an oscillating simple pendulum is given by
(a) $a = -\frac{Ly}{g}$ (b) $a = -\frac{gy}{L}$ (c) $a = \frac{gy}{L}$ (d) $d = \frac{Ly}{g}$

88) The restoring force of an oscillating simple pendulum is given as (a)$F=mg\sin\theta$ (b) $F = -mg\sin\theta$ (c) $F = g\sin\theta$ (d) $F = -g\sin\theta$.

89) One of the following best describes the restoring force of an oscillating simple pendulum (a) $F = \Sigma\sin\theta$ (b) $F = -\Sigma\sin\theta$ (c)$F = ky$ (d) $F = -ky$ where Σ is the weight of the oscillating bob.

90) One of the following best describe the angular velocity of an oscillating simple pendulum (a) $w = \sqrt{L/g}$ (b) $w = 2\sqrt{L/g}$ (c) $w = \sqrt{g/L}$ (d) $w = 2\sqrt{f}$.

91) One of the following describes hooks law (a) f= -ky (b) f=ky (c)f=ma (d)f=gy.

92) One of the following best describes the restoring force of an oscillating loaded spiral spring (a)$f=\Sigma\sin\theta$ (b) $f=-\Sigma\sin\theta$ (c) f=ky (d) f=-ky where Σ is the weight of the oscillating object.

93) The period of an oscillating loaded spiral spring is give as
(a) $T = 2\sqrt{\frac{k}{M}}$ (b) $T = 2\sqrt{L/g}$ (c) $T = 2\sqrt{g/L}$
(d) $T = 2\sqrt{\frac{m}{K}}$

94) The period of an oscillating loaded spiral spring depends on
(a)$\sqrt{m^{-1}}$ (b) $\sqrt{L^{-1}}$ (c) $\sqrt{L}$ (d) $\sqrt{m}$ (e) None.

95) The physical significance of the period of an oscillating loaded spiral spring is (a) $T \propto m$ (b) $T \propto L$ (c) $T \propto \sqrt{m}$ (d) $T \propto \sqrt{L}$

96) The period of oscillating spiral spring when the spring mass is considered is
(a) $T = 2\sqrt{\frac{M_o - M_1}{K}}$ (b) $T = 2\sqrt{\frac{M_o + M_l}{k}}$
(c) $T = \sqrt{\frac{M_o + M^l}{g}}$ (d) $T = 2\ M_o$.

97) The acceleration of an oscillating loaded spiral is given by

98) (a) $a = \frac{k\,y}{m}$ (b) $a = \frac{m\,y}{k}$ (c) $a = -\frac{ky}{m}$
(d) $a = -\frac{my}{k}$
Note: Please my fans $a = \left(-\frac{k}{Mo+M}\right)y$ is still
correct but can be expressed when the mass of the spring is put in considerations.

99) The angular velocity of an oscillating spiral spring is given as _____ (a)w=2 f (b) $w = \sqrt{m}/_k$ (c) $w = \sqrt{k}/_m$ (d) $w = 2\ \sqrt{k}/_m$ (e) None.

100) The period of an oscillating liquid in a U – tube is given by (a)$T=2\ \sqrt{k}/_m$ b) $T = 2\ \sqrt{g}/_x$ (c) $T = 2\ \sqrt{x}/_g$ (d) $w = 2\ \sqrt{m}/_k$

101) The equation of motion of an oscillating liquid in a U-tube is
(a)$a=\frac{xy}{g}$ (b) $a = \frac{gy}{x}$ (c) $a= -\frac{gy}{x}$
(d) $a = \frac{xy}{g}$
Note: The answer can also be
$a = \frac{gx}{L}$

102) The restoring force of an oscillating liquid in a U – tube is given as

103) The period of an oscillating compound pendulum is given as _____
Ans $T = 2\ \sqrt{\frac{I}{mgh}}$ where I – moment of inertia

104) The restoring force of an oscillating compound pendulum is given as _____

105) The motion of a body in simple harmonic motion which gradually loses it energy due to air resistance thereby gradually, reducing the amplitude of such motion unit it eventually get to zero is known as (a)Free oscillation (b)simple pendulum (c)Damped oscillation (d) Resonance (e)Force oscillation.

106) Mention the 3 types of oscillation _____, _____ and _____

107) The type of oscillation in SHM where the amplitude is constant progressively is called (a)Damped oscillation (b) Free oscillation (c) Force oscillation (d) Simple pendulum (e) None.

108) Damped oscillation is best describe by the equation _____

109) Equation for free simple oscillation is given as _____

110) The equation for damped oscillation in simple pendulum is given as _____ and for spiral spring is given as _____ and for oscillating U-tube is given as _____ also.

111) The equation for free oscillation in simple pendulum, spiral spring and oscillating U-tube is given as _____, _____ and _____

112) In the following relation $y = Ae^{-}(\frac{b}{2m})^t \cos(w^1+\phi)$,

the term $e^{-\frac{b}{2m}t}$ is referred to as (a) oscillating term (b) force term (c)restoring function (d)Damping term.

113) From question 112, what is the meaning of the following A_____

$e^{-(\frac{b}{2m})^t}$ _____ $Ae^{-(\frac{b}{2m})^t}$ _____and cos $(wt+\phi)$ _____

114) Pendulum bob oscillating freely in air is example of (a)critical damping (b) under damping (c)over damping (d)heavy damping.

115) In damped oscillation, the amplitude a)increases progressively (b)remain constant (c) decreases progressively (d)equals.

116) In free oscillation, the amplitude (a)increases progressively (b)remain constant (c) decreases progressively (d)equals.

117) Car suspension system is an example of (a) under damping (b)over damping (c) critical damping (d) heavy damping.

118) Car brake system is an example of (a)Under damping (b)over damping (c)critical damping (d) light damping.

119) Force oscillation is describe by (a)$f+f^1=-f^1$ (b) $f+f^1=0$ (c)$f+f^1=-f^{11}+f^{111}$ (d) $f=f^{11}+bv$ (e) None.

120) During forced oscillation, if the damping factor is negligibly small, we may have a situation known as (a)under damping (b) over damping (c)heavy damping (d) resonance.

121) During forced oscillation, if b = 0 (a)Resonance will occur (b)resonance will not occur (c) over damping will occur (d) under damping will occur.

122) The condition for over damping is that _____ (a) $\frac{b2}{4m2} = \frac{k}{m}$ (b) $\frac{b2}{4m2} > \frac{k}{m}$ (c)$\frac{b2}{4m2} < \frac{k}{m}$ (d) $w1 = \sqrt{\frac{b2}{4m2}} - \frac{k}{m}$

123) The condition for under damping is _____ and the condition for critical damping is _____

124) For a spiral spring, the equation of forced oscillation is given as _____

Ans $f = ky = - ky – bv+f^{111}$

125) A phenomenon whereby the frequency of an oscillating system matches or coincides with the frequency of an external applied periodic force is (a)critical damping (b) Resonance (c)vibrance (d) over damping.

126) The relationship between linear or tangential velocity and angular velocity of a rotating body is given as (a)$v=w^2r$ (b) $v=wr$ (c) $v=^r/_w$ (d)$v=^r/_w$ (d)$v=w^2r^2$ (e) None.

127) An object is rotating about an axis 0 at a radius of 0.45m and at a constant angular acceleration of 4.2 $rad5^{-2}$. After 3 seconds calculate.

i. Angular speed Ans $12.6rads^{-1}$
ii. Angular displacement Ans 18.9radian
iii. Linear speed of the particle Ans 5.67m/s
iv. Tangential acceleration Ans $1.89m/s^2$
v. Centripetal acceleration Ans $71.44m/s^2$

128) A disc of diameter 8cm rotates from rest at constant angular acceleration of $4.0rad/s^2$. What is the tangential velocity of a point on its rim at the 3^{rd} second of the rotation (a)0.816m/s (b)12.0m/s (c) 96.oom/s (d)0.48m/s (e) 32.0m/s.

129) When a CD plate of radius 10cm, is started, it rotates at an angular acceleration of 3.7 $rads^{2.}$

For a paper stuck at 2cm from the rim, calculate at the fourth second the tangential speed (a)0.89m/s (b)0.65m/s (c)1.18m/s (d) 1.84m/s (e) 0.59m/s.

130) The angular position of a point on the rim of rotating turntable is given by $\theta = 4t - 3t^2 + t^3$, calculate the average acceleration of the turntable for the interval t = 2 to t = 4 seconds (a) 3 rad/s^2 (b) rad/s^2 (c) 10 rad/s^2 (d) 12 rad/s^2 (e)none.

131) An instantaneous angular velocity W_x of a flywheel at any time t, is given by by $W_x = (10.0\text{rad}/5^2)t^2$. Find the average angular acceleration between t_1=2.0sec and t_2 = 5.0 sec (a) 60 rad/s^2 (b) 70 rad/s^2 (c) 80 rad/s^2 (d) 90 rad/s^2.

Note: Please don't divide by 2, because average acceleration is $a_{av} = \frac{\Delta v}{\Delta t}$.

132) A plate has a radius of 0.15m and rotates at 6rpm. Calculate the total distance starting from 2 min? (a)60rad (b) 75.4rad (c)85.3rad (d)105rad (e)none.

133) Calculate the angular speed of the second hand of a watch (a)0.010rad/s (b) 1.0 rad/s (c) 60 rad/s (d) 1.7x10^{-3} rad/s (e) 0.10rad/s.

134) Calculate the angular speed of the minute hand of a watch (a)0.1rad/s (b) 1.7x10^{-3} rad/s (c)0.04 rad/s (d) 0.02 rad/s (e) none.

135) The ratio of the angular speed of the minute hand of a watch to its second hand is (a)1.7x10^{-3} (b) 1.7x10^{-4} (c) 590 (d) 1.7x10^{-2} (e) 0.10.

136) If a force f = 2i + 3j − 7k acts on a particle at position r = 4i − j + 8k. calculate the torque exerted on the particle about the origin (a) 50.2NM (b) 49.2NM (c)32.4Nm (d) 70NM.

137) An angular acceleration of a rotating body is given by a = 4at^3 + 2bt where t is time and a and b are constants. If the wheel has an initial angular speed of W_o, write the equations for the angular speed (a)w=4at^3+2bt (b)w=at^4+bt^2+w_o (c)w=at+bt+w_o (d) None.

138) From the same question, obtain the angular displacement? Ans $\theta = \frac{at5}{5} + \frac{bt3}{3} + W_o + \theta$.

139) Moment of inertia is defined as the product of _____ and _____

Note: Moment of inertia of any particle depends on 3 things which include:

(1) Mass of the body (2) The distribution of the mass of the body which means the shape of the body (3) The location and orientation of the axis of the rotation. You may be ask.

140) Two point masses of M_1 = 20kg and M_2 = 15kg are held 50cm apart calculate the moment of inertia
   i. About an axis passing through M_1.
   ii. About an axis passing through 10cm from M_1.

141) Two point masses of M_1 = 20kg and M_2 = 30kg are held one metre apart. Calculate the moment of inertia about an axis 40cm from M^2 (a)14kgm^2 (b)30kgm^2 (c)30kgm^2 (d)12kgm^2 (e)10kgm^2.

142) Rigid body is a body for which the distance between any two points is (a)infinite (b) finite (c) variable (d)invariable (e) uncertain.

143) What is the unit of moment of inertia, the dimension and determine if it's a scalar or a vector.

144) A point particle of mass 4kg is rotating about vertical axis 10m from it. If the body complete 2 revolutions every 3 seconds

Calculate (i) Moment of inertia of the body about the axis of rotation

(ii) Frequency of rotation

(iii) Period of rotating

(vi) Kinetic energy of

rotation.

145) What is the moment of inertia of the following

a) Moment of inertia of a uniform rod axis of rotation from the center _____

b) Moment of inertia of a uniform rod axis of rotation from one end_____

c) Moment of inertia of a bar of length L and mass M about an axis passing through the center and one end _____ and _____

d) Moment of inertia of a circular disc of radius a and of mass M about an axis passing through the center and per pendicular to the surface is _____

e) Moment of inertia of a solid sphere of mass M and radius R about any diameter is _____

f) Moment of inertia for a thin walled hollow sphere is _____

g) Moment of inertia for a ring _____

h) Moment of inertia for a spherical shell _____

146) A rotating disc of mass 2kg has a radius of close to 0.5m. calculate the kinetic energy if the speed of the disc is 5rev/s (a) 4j (b)246.49j (c)340j (d) 114j (e) None.

147) The total kinetic energy of a body under the influence of torque is known as (a) ½ Iw^2 (b) $1w^2$ (c) 1w (d) ½ Iw (e) $2Iw^2$.

148) The kinetic energy of rotating of a rigid body is given as (a)1/2 mv2 (b)1/2 mrw^2 (c) ½ Iw^2 (d) ½ mr^2 (e) none.

149) A bar of length 100cm and mass M = 0.50kg the moment of inertia about an axis through one end is (a)0.5kgm^2 (b)0.24kgm^2 (c)2.0kgm^2 (d)0.7kgm^2 (e)None.

150) If the axis passes through the middle calculate the moment of inertia (a)0.5kgm^2 (b) 0.2kgm^2 (c) 0.06kgm^2 (d)0.01kgm^2.

151) The distance of axis of rotation and the point at which the whole mass of the body can be supposed to be concentrated so as to have the same moment of inertia as that of the body about that axis is called (a)radius of gyration (b) turning effect (c) positional axis (d)couple (e)Torque.

152) The radius of gyration of a uniform rod of length L = 100cm rotating about axis through the center is _____

153) The radius of gyration of a thin walled hollow sphere is _____

154) Find the radius of gyration of a solid sphere of diameter 10cm rotating about an axis a.0.032m (b) 0.019m (c) 0.063m (d) 0.044m (e) 0.63m.

154) Fine the moment of inertia of a rod about an axis through one ends if the length of the rod is 2x and its mass M

(a)$\frac{a}{b}$ mx^2 (b)$\frac{mx^2}{2}$ (c) $\frac{4}{3}$ mx^2 (d) mx^2 (e)None.

155) A body rolling down posses (a)Translational energy only (b)Rotational energy only (c)Translational and rotational energy (e) none.

156) A cylindrical solid of length L = 10cm and radius R = 10cm and mass 40g is rolling down hill at a speed of $100m5^{-1}$. Calculate the total kinetic energy of the solid (a)30j (b) 300j (c) 150 (d) 3000j (e)None.

157) Critical damping is best applied in (a)firing a retro-rocket (b)vehicle automated breaking system (c)operation of piston and crankshaft (d)vehicle suspension system.

158) A solid sphere and a solid cylinder of equal radii and masses are to be released simultaneously at the top of a inclined which one get to the bottom of the plane first (a) cylinder (b) sphere (c)both of them (d) None of them.

159) A ballerina is rotating with constant angular velocity w, angular momentum L and Moment of inertia I. what must she do to end her rotation? A Reduce her arm in order to reduce I since L is conserved B. stretch her arms in order to increase I because L is conserved C stretch her arms in order to reduce I because L is conserved D reduced her arms in order to increase w since I must reduce to zero E. Reduce I by folding her arms because L is conserved.

160) The radius of gyration for a cylinder of equal radii and masses are to be released simultaneously at the top of an inclined plane. Another pair of sphere and cylinder with half the radii and masses of the first pair are also place atop the incline plane such that the four are released simultaneously. Which one get to the bottom of the plane last? (a)The smaller sphere (b)the smaller cylinder (c) the big sphere (d) the big cylinder (e) the two cylinder.

161) The product of the moment of inertia of a rigid body and the rotational acceleration is known as (a)Angular frequency (b)Angular momentum (c)torque (d) linear momentum (e)impulse.

162) Oscillation of ceiling fan is an example of _____

163) Oscillation of simple pendulum in air is an example of _____

164) Car suspension system is example of _____

165) Reverbration of a bridge when soldiers march on it is an example of _____

166) The product of moment of inertial and angular velocity is known as (a)Torque (b) angular momentum (c)impulse (d)angular frequency (e)linear momentum.

167) Which of the following is correct about torque (i)Torque causes rotational (ii)Torque is the turning effect of a force on all axis (iii) Torque is a pull or push on a body to cause to move (iv) Torque is the moment of a force (a)I i only (b) ii only (c) i, ii, iv (d) i, ii, iii, iv (e) None.

168) The product of Torque and angular velocity of a rotating body is called (a)power (b) energy (c) couple (d)workdone by a couple (e) None.

169) In translational motion of a body the acceleration is caused by _____ and in rotational motion the angular acceleration is caused by _____

170) The moment of a force is called _____ while the moment of linear momentum is called _____

171) Angular momentum (L) and torque T are related by the following expression
(a) $T = \frac{mdL/Dt}{dt}$ (b) $T = \frac{dl}{dt}$ (c) $L = \frac{mdT}{dt}$
(d) $\frac{dL}{} = r \times T$ (e) None.

172) The rate of change of angular momentum is called (a)Torque (b)Impulse (c)linear momentum (d) moment (e) none.

173) Conservation of angular momentum L implies (a)L=rP (b)L=$\frac{dT}{dt}$ (c)$\frac{dL}{dt}$=0 (d) T=$\frac{dL}{dt}$ (e) none

174) The angular momentum of an object is given by $L = 3t^2 - 18t + 12$ where t is in seconds. Calculate the time at which the angular momentum is conserved (a)3 sec (b) 2 sec (c) 4 sec (d) 5sec (e)None.

175) The angular momentum of an object is given as $L = t^3-6t^2+3$ At what time does the turning moment equal zero (a)2sec (b)5sec (c)6sec (d)1sec (e)4sec.

176) Which of the following scientist proposes that the planets revolve round the sun, the sun being the centre (a)kepler (b)Copernicus (c)Newton (d)Tycho Brahe.

177) Which theory makes the sun at the centre of the solar system (a)copernical theory (b) Johannes Kepler's law (c)Newtons law (d)Tycho Brahe law.

178) The laws of planetary motion were given by (a)Tychobrahe (b)Isaac Newton (c)Johannes Kepler (d) Nicolaus Copernicus (e) John Kepler.

179) Which of the following correct about the Kepler's law.

i. All planets moves in elliptical orbits having the sun as the focus

ii. A line joining any planet to the sun sweep out equal area in equal time.

iii. The square of the period of any planet about the sun is proportional to the cube of the planets mean distance from the sun ($T^2 \propto r^3$).

(a) i only (b) ii only (c) i and ii (d) i, ii and iii (e) None.

180) The line joining the sun and the planet sweeps out equal areas in equal intervals of time is (a) Keplers first law (b)Newtons law of gravity (c) keeplers 2nd law (d) Hooke's law (e) None.

181) $T^2 \propto r^3$ or $T^2 = kr^3$ is an expression of (a)keeplers 1st law (b) Keeplers 2nd law (c) Keepler 3rd Law (d) Newtons law (e) None.

182) If two masses a and b are separated by a distance c, which of the following is the statement of Newton's law for the system (a) $f \propto \frac{ab}{c^2}$ (b) $f \propto \frac{ab}{c^3}$ (c) $f \propto \frac{ab}{c}$ (d)$f \propto -ab$ (e) none.

183) Which of the following is correct about newtons law?

i. Force (f) is directly proportional to the produce of the masses.

ii. Force (f) is inversely proportional to the square of their distance of separation.

iii. F is the force of attraction (a) i only (b) ii and iii (c) i and ii (d)i,ii and iii (e) None.

184) Which of the following is Newtons law of gravitation (a)$F \propto M1M2$ (b) $f \propto 1/r2$ (c) f = CM1M2, C is a constant (d) $F = \frac{GM^1M^2}{r^2}$, G is gravitational constant

(e)None.

185) Calculate the magnitude of the gravitational force between two objects of 90kg and 120kg separated by 15m (Take G = $6.67 \times 10^{-11} Nm^2/kg^2$) (a)$3.8x10^{-9}N$ (b)$3.2x10^{9}N$ (c) $3.2x10^{-9}N$ (d)$3.8x10^{9}N$ (e)None.

186) Calculate the gravitational force between two protons placed 2mm apart (Take protonic mass = $1.67x10^{-27}kg$ and G = $6.67x10^{-11}NM^2/kg^2$) (a)$18.6x10^{-5}N$ (b)$18.6x10^{-75}N$ (c) $4.65x10^{-58}N$ (d)

$4.65x10^{-57}N$.

187) Mass of the earth is given by
(a) $M=\frac{4\ ^2r^3}{GT^2}$ (b)$M=\frac{4\ ^2r^2}{G}$ (c) $M = \frac{gR}{G}$
(d) $M = \frac{gR^2}{G}$ (e)None.
The mass of the sun is given by
(a) $M=\frac{4\ ^2r^3}{G}$ (b)$M=\frac{4\ ^2r^3}{G}$ (c) $M = \frac{gr}{GT}$
(d) $M = \frac{gr^2}{G}$ (e) $M=\frac{4\ ^2r^3}{GT^2}$

The expression for the free fall across the surface of the earth is given as _____

188) The expression for the acceleration due to gravity and universal gravitational constant is _____

189) State the major difference between g and G.

190) If the earth is considered as a spherically symmetric with radius R and mass Me, then the weight w of a small body of mass m at the earth's surface is
(a)$W=\frac{GMe}{R^2}$ (b) W = FMeg
(c) $W = \frac{GMem}{R^2}$ (d)W = mgw.

191) If two objects are released from a certain height neglecting the acceleration due to gravity (a) The two will fall at the same time (b)The two will not fall at the same time (c) one will reach before the other (d) None.

NOTE: Two object are released from a certain height will fall at the same time because acceleration due to gravity does not put into consideration their masses (m).

192) The gravitational force obeys _____ law at points outside the earth.

193) Inside the earth the gravitational force does not obey inverse square law True or False.

194) The plane mercury has mass $3.36x10^{23}kg$ and radius 2500km calculate its acceleration due to gravity ($G = 6.67x10^{-11}NM^2/kg^2$) (a)9.81ms/s2 (b)$9.0ms^{-2}$ (c)$1.67ms^{-2}$ (d)$3.60x10^6ms^{-2}$ (e) None.

195) If the gravitational attraction on the surface of a planet of mass $1.0x10^{20}kg$ is $2.7ms^{-2}$. Calculate the radius of the planet (a)40km (b)49.8km (c)1.37km (d) 50km (e) None.

196) Calculate the acceleration due to gravity at a height of 200km above the surface of the earth (a)$8.0ms^{-2}$ (b) $4ms^{-2}$ (c0 $6.2ms^{-2}$ (d)$5.7ms^{-2}$ (e) None.

197) Calculate the period of oscillation of pendulum of length 4cm (a)0.3sec (b) 2.0 sec (c) 4.5sec (d) 0.526sec (e) None.

198) The mass of the moon is about $^1/_{81}$ that the earth and its radius is ¼ that of the earth. What is the acceleration due to gravity on the surface of the moon (a)$W=\frac{GMe}{Re^2}$
(b) $W = \frac{16\ GMe}{81Re^2}$ (c) $\frac{GMe}{81Re^2}$ (d) $\frac{GMe}{4Re^2}$ (e) None.

199) Note your answers can be given in figures, if that is the case please do this is the exam hall

200) Scientists is a space craft discovered that the acceleration due to gravity in their location is $3.7m/s^2$. Calculate the altitude of their position (Take $Me = 6.0x10^{11}kg$, Re=6400km G = 6.67 x $10\text{-}11NM^2/kg^2$)
(a) 3400km (b) 64,023km (c) 54,56km (d)36,40km (e) None.

201) The expression for the density of the earth with mass M_e acceleration due to gravity g, radius R, gravitational constant G is given as
(a) $\frac{2g}{4\ RG}$ (b) $\frac{3g}{4\ RG}$ (c) $\frac{4g}{4\ ^2G}$ (d) $\frac{3g}{4\ G}$
(e) None.

202) The mass of the moon is about $^1/_{81}$ that of the earth and the distance from the centre of the earth to that of moon is about $4.0x10^5km$, at what point between the earth and the moon will the resultant g force on a space-craft becomes zero (a)3.6×10^5km from the centre of the earth (b)$3.6x10^5km$ from the centre of the moon (c) $4.0x10^5km$ from the centre of the earth (d) $4.0x10^5km$ from the centre of the moon.

203) The mass of the earth is 81 times the mass of the moon. Find the point of weightlessness between the earth and the moon. If the distance from earth to moon is $4.0x10^5$km (a) 3.6×10^5km from the centre of the moon (b)$3.6x10^6$km from the centre of the earth (c)$4.0x10^5$km from the centre of the earth (d)4.0×10^5km from the centre of the mon (e) None.

Note please my fans, always use the formular $\frac{S}{R} = \frac{9}{10}$ where R is the earth to moon distance and S is the distance from the centre of the earth to the point of weightlessness.

204) The velocity given to a body so that it escapes from the influence of the gravitational field is called _____

205) The expression for escape velocity is given as _____ or _____

206) The gravitational on the earth's surface is given by
(a) $\frac{GM}{R}$ (b) $-\frac{GM}{R}$ (c) $\frac{GM}{R^2}$ (d) $\frac{-GM}{R^2}$
(e) $\frac{GMm}{R}$

207) Scientist in a spacecraft discovered that the acceleration due to gravity in their location is $3.7m/s^2$. Calculate the altitude of their location (Take R_e = 6400km, Me = $6.0x10^{24}$kg G = 6.67x10-11Nm^2/kg^2. (a) 64023km (b)400km (c)6400km (d) 230km (d) 4500km.

208) The gravitational potential at any point on or above the earth's surface is defined as (a)The workdone to bring a mass from infinity to that point (b) The workdone to bring a unit mass from infinity to that point (c)the workdone to take a unit mass from the surface of the earth to that point (d)the potential energy of the mass at that point (e)None.

209) Newton's law of universal gravitation can be expressed according to the following relation except (a) $f \propto R^{-2}$ (b) $f \propto MM$ (c) $f = GmMR^{-2}$ where G is gravitational constant (d) f = UmM, where U is universal energy density (e) None.

210) On the surface of the earth of radius r, the gravitational potential is _____ while the its energy known as the gravitational potential energy is _____
Ans $V = -\frac{GM}{R}$, $W = \frac{GM_eM}{R}$

211) A region round a material body in which its gravitational attraction is experienced by others is called (a)Gravitational energy (b)gravitational field (c) gravitational force (d)electrostatic force (e) None.

212) The gravitational field is defined as (a)The gravitational force of repulsion per unit mass at that point (b) The gravitational force of attraction per unit mass at the point (c) The workdone in bringing a unit mass from infinity (d)None.

213) The field strength at a point in a gravitational field is defined as _____ Ans as the force per unit mass at that point $g = {}^{f}/_{m}$.

214) If an earth's satellite of mass m moving with a velocity V round the earth's surface at a height h. if the radius of the earth is R then the force of attraction on the satellite is _____ Ans $F = \frac{GMm}{(R+h)^2}$

215) The velocity of the satellite is also given as _____ Ans $V2 = \frac{GMm}{R+h}$

216) From the formular V2 =GM/R+H, the velocity of the satellite does not depends R+h on the mass of the satellite when orbiting.

217) The mass of the earth is ten times the mass of a planet P. if the gravitational acceleration on the surface of P is $3.9m/s^2$ calculate the radius of P. (Take Re = $6.4x106^{m}$) (a)$4.2x10^2$m (b)$3.2x10^6$m (c)3.2x10 (d)$3.2x10^3$m (e)None.

218) From the this question, calculate the escape velocity from P (a)$4.0x10^3$m/s (b)$3.0x10^3$m/s (c) $5.0x10^3$m/s (d) 4.5×10^3m/s (e)None.

219) What is the gravitational potential at the earth's

surface (Take Me = $6.0x10^{14}$kg, G = $6.67x10^{-11}$Nm R_e = 6400km) (a)$8.2x10^7$J kg-1 (b)$6.28x10^7$jkg-1 (c) $6.18x10^2$jkg (d)$2.0x10^6$jkg-1 (e) none.

220) Calculate the force of attraction between the earth and the moon if the average earth-moon distance is 3.84 x 10^{10}cm, (Take make of the moon $7.30x10^{25}$g mass of the earth = $54.98x10^{27}$g (a) $1.989x10^{20}$N (b)$1.5x10^2$N (c) $1.3x10^{20}$N (d) $4.0x10^{20}$N (e) None.

221) What is the acceleration due to gravity at a point where the radius of the earth is $6.38x10^6$m and escape velocity measured as 1180ms^{-1} (a)$9.2s^{-2}$ (b)$9.78ms^{-1}$ (c)$9.85ms^{-1}$ (d) $9.88ms^{-1}$ (e)none.

222) Which of the following is/are properties of gravitational forces (i)Usually attractive (ii) electromagnetic in nature (iii) are pushes (iv)Independent of position of the body (a) i only (b) i and ii (c) i and iii (d) ii only (e) None.

Please my fans, take note of the following properties of gravitational field.

i. Gravitational field shows only the force attraction

ii. Gravitational field is directed towards the centre of the earth.

iii. Gravitational field gets stronger as it gets closer to the force of the earth surface.

223) A 5m platform of weight 150N is suspended from the roof of a house by ropes attached to its ends. A painter weighing 800N stands 1.5m from the left end of the platform calculate the tension in each rope. (a) 600N and 300N (b)435N and 315N (c) 515N and 205N (d) 615N and 335N (e) 635N and 315N.

224) The change of the state of rest of an object is called (a)force (b)acceleration (c) motion (d) velocity (e) None.

225) Human being rotate with the earth at a speed (Take Re=640km) (a)$465ms^{-1}$ (b)$560ms^{-1}$ (c)$360ms^{-1}$ (d) $400ms^{-1}$ (e) none.

226) The motion of a gas molecule is an example of motion (a)Random motion (b) Translational motion (c) Rotational motion (d) linear motion (e)none.

227) The branch of science that studies motion is association with force producing the motion is called (a)Kinematics (b)Dynamics (c) statics (d)properties of matter (e) None.

228) The study of a body in motion without force is called (a)Dynamics (b)statics (c)kinematics (d) properties of matter (e)None.

229) The kind of motion a body undergoes without knowing its cause is called _____.

230) A stone is thrown vertically upwards with an initial speed of 1000km/hr, calculate the maximum height reach by the stone (a)3904.95m (b)3937.4m (c)384.5m (d)4045.2m (e)None.

231) Also from the same question, calculate the time it takes to reach the maximum height (a)30 sec (b) 40 sec (c) 10 sec (d)28.3 sec (e)none.

232) A stone is thrown vertically upwards at an initial speed of $216kmhr^{-1}$ in a location where the acceleration due to gravity is $9.8/ms^{-2}$. Calculate the maximum height reached and the time it takes the stone to reach the maximum height (a)183.49m and 6.116sec (b) 283.4m and 5sec (c)143.9m and 10.2 sec (d) 180.4m and 12.23 sec (e) none.

233) A stone is thrown into a well repeatedly and the time it took for the stone to reach the bottom of the well is noted each time with a stop watch. If the average of such time is 2.7 sec. calculate the depth of the well. (Take g = $9.78ms^{-1}$) (a) 40m (b) 28.3m (c) 45m (d) 80.4m (e) 35.6m.

234) If a car moves from Enugu to Nsukka and back to Enugu covering a total distance of 140km in

2 hours calculate the average speed of the car (a)25.9ms^{-1} (b) 35.2ms^{-1} (c)19.4ms^{-1} (d)200ms^{-1} (e) None.

235) A ball of mass 0.1kg is thrown vertically upwards with an initial speed of 20ms^{-1}. Calculate the time taken to return the thrower (a)4sec (b)2sec (c)1.5sec (d) 5 sec (e) 3 sec.

236) A stone is dropped from rest to fall frelly in a location where g = 9.8m/s^2 after 10 seconds calculate the velocity of the stone (a)490m/s (b) 28m/s (c)2.8m/s (d) 5.2m/s (e) 9.8m/s.

237) A car starts from rest and accelerates at a speed of 10,000km/h for 10 minute calculate the acceleration of the car in S.I unit (a00.2m/s^2 (b)0.77m/s^2 (c)0.01m/s^2 (d)0.08m/s^2 (e) none.

238) Also from this question, calculate the final speed of the car after 10 minute (a)300m/s (b) 462m/s (c) 436m/s (d)352m/s (e) none.

239) If the distance, S in metres covered by an object moving within a time t(s) is given as S = $2t^3 + 3t^2 + 5t + 7$. Calculate (i) The distance travelled in the first two minutes (ii) The velocity attained after 2 minutes (iii) The acceleration after one second. Ans (i) 3499.8km (ii) 87.13kms^{-2} (iii) 18ms^{-2}.

240) The velocity of a particle in kms^{-1} varies with time according to the equation $V = 3t^2 - 4t + 4$ (i) What is the maximum velocity attained by the particle? (ii) What is the acceleration at the point of maximum velocity? (c)Calculate the total distance moved by the particle between the time t = 0 and t = 4 sec. Ans (i) 2.666km/s (ii) a=0 (iii) 240km.

241) Which of the option best describe the time it takes a ball to reach to the maximum height in a projectile motion.
(a) $\frac{U^2\sin\theta}{G}$ (b) $\frac{U\sin\theta}{g}$ (c) $\frac{2U\sin\theta}{g}$
(d) $U^2\sin^2\theta/2g$ (e) None.

242) The expression for the maximum height reached in a projectile motion is
(a) $\frac{U^2\sin^2\theta}{G}$ (b) $\frac{U\sin\theta}{g}$ (c) $\frac{2U\sin\theta}{g}$
(d) $U^2\sin^2\theta/2g$ (e) None

243) Which of the option best describes the shape of the path taken by a projectile motion
(a) T = $\frac{2u\sin\theta}{g}$ (b) y = $U\cos\theta 2\ \frac{u\sin\theta}{g}$
(c) R = $\frac{u^2\sin^2\theta}{g}$
(d) y =$x\tan\theta - \frac{gx^2}{2u^2}(1+\tan^2\theta)$ (e) None

244) Which of the option best describes the parabolic trajectory taken by a projectile in motion.
Ans $y = x\tan\theta - \frac{g(1+\tan^2\theta)x^2}{2u^2}$
Or
$y = x\tan\theta - \frac{gx^2\sec^2\theta}{2u^2}$

245) At what angle in a projectile motion will the range be max _____

246) A ball is kicked into the air at angle $/_4$ radian to the horizontal and with a velocity of 72km/h. neglecting air resistance to the ball.

Calculate (i) Time it takes the ball to reach the maximum height (ii) Total period of flight of ball (iii)Maximum height reached (iv)Horizontal range of the ball.

247) A small object is projected from a platform 3m above the ground level with a velocity of 120m/s at an angle of 45^0 to the horizontal. Calculate its range from the point of projection. Take g = 10m/s^2.

Note: Please my fans use the following formulars
From a certain height thrown at an angle θ to the ground.
Time of flight $T=\frac{U\sin\theta}{g} + \sqrt{2\frac{(H+h)}{g}}$
Range, R = UxcosθT
From a certain thrown horizontally to the ground angle not given.
Time of flight $T = \sqrt{\frac{2H}{g}}$
Range $R = U\sqrt{\frac{2H}{g}}$

248) A body is said to be in translational equilibrium if the resultant forces acting on it is (a) large (b) positive (c)small (d) zero (e)negative.

249) The moment of a force about a point is called (a)momentum (b)Torque (c)momentum (d) impulse (e) none.

250) The turning effect a body produces is called (a)Moment of a force (b)impulse (c)momentum (d) couple (e)none.

251) The S.I unit of moment is (a)Nm^2 (b) Nm (c)m^2 (d) N/M (e) none.

252) A system of two equal forces acting in opposite directions on a body constitutes (a)moment (b) resultant (c) Torque (d)couple (e) None.

253) For every objects, the resultant earth's gravitational force on the body or its weight is regarded to be concentrated at a point and this point is called_____

254) The center of gravity of a uniform metre rule is located at its (a)end point (b) mid point (c)edge point (d) all the body (e)none.

255) The centre of gravity of a disc is located at the (a)centre (b) end (c)edges (d) at all the point (e) none.

256) The centre of gravity of a uniform triangular lamina is located at _____ Ans A point two thirds the distance from any vertex to the mid point of the opposite side.

257) A point where the total mass of a body appears to be concentrated is called _____

258) The stability of a body depends on (a)Position of its centre of gravity and mass (b) position of its centre of gravity and the moment of its weight about an axis (c) moment of inertia and mass (d)shape and axis of rotation (e)none.

259) What type of equilibrium is possessed by a body if slightly displaced and released it returns to the original position (a)Neutral (b)stable (c)unstable (d)translational (e)None.

260) A slight displacement of a body will cause it to topple over is an example of (a) stable equilibrium (b)unstable equilibrium (c)Neutral equilibrium (d)Translational (e)None.

261) What type of equilibrium is possessed by a body if slightly displaced and released, remains at its new position without change in its C.G (a)stable (b)unstable (c) neutral (d)static (e)Dynamic.

262) For a stable equilibrium potential energy (a)decreases with a light displacement (b)increases with a light displacement (c)remain unchanged (d)double by half (e)none.

263) What happens to the potential energy and C.G for the following equilibrium (i)stable _____

(ii) unstable_____

(iii) Neutral _____

264) A body of mass 8kg is suspended by a string and pulled by a horizontal force of 55N. Calculate the tension T on the string if the body is in equilibrium (a)55.580N (b) 58.01N (c)97.10N (d)99.10N (e) 98.

265) A body of mass 6kg is suspended by a string and pulled by a horizontal force of 40N. Calculate the tension T on the string if the body is in equilibrium (a)52N (b) 32N (c) 72N (d) 82N (e) None.

266) Calculated the torque on the rod acted by two forces of 50N each separated by a distance of 80cm (a)40Nm (b)80Nm (c)50Nm (d)20Nm (e)50Nm.

267) A uniform 1m rod pointed at the centre is caused to turn through 3 revolutions by two forces each of 10N applied in both ends of the rod to constitute a couple. Calculate the torque on the rod and the work done by the couple. (a)5Nm and 80j (b) 10Nm and 30j (c)10Nm and 188.5j (d)20Nm and 20j (e)None.

268) A beam of length 5m has weight 200N hung at

one end and 150N at the other end. Neglecting the weight of the beam itself, calculate the balance point of the beam (a)2.00m (b) 1.98m (c) 2.14m (d)1.80m (e) 2.50m.

269) If each of the forces in a couple is 50N and their lines of action are separated at a distance 80cm, calculate the work done by the couple in turning through 4 revolutions (a)200j (b) 300.5j (c)1005.3J (d)204.34j (e) None.

270) A uniform rod of length 80cm is pointed at the 30cm mark and horizontally balanced by a mass of 50kg hung from 4cm mark. Calculate mass of the rod (a) 130kg (b) 80kg (c) 105kg (d) 95kg (e) 150kg.

271) A uniform 1m metal rod of mass 50kg is suspended horizontally by two wires attached at the 20cm and 90cm respectively from the ends of the rod. Calculate the tension in each wire (a)214 and 286N (b)308 and 201N (c)214 and 423N (d)214N and 286N (e)None.

272) The moment of a force about a point is defined as (a)Product of force and radius (b)product of force and the perpendicular distance (c)force and torque (d) product of mass and distance (e) None.

273) A body acted on by several forces is said to be in equilibrium (a) if it has acceleration and rotates (b)it doesn't have acceleration or rotate (c) if the rotation is zero (d) the force is equal the weight (e) none.

274) A body in equilibrium under the action of parallel forces must satisfy two conditions state them

i. _____

ii. _____

275) A weight of 50N is suspended from the hook on a ceiling and is being pulled aside by a horizontal string until the supporting spring makes angle 40^0 with the vertical calculate the tension T.

276) The measure of the amount of change a force produces when it acts upon a body is called (a) Energy (b) Power (c) work (d)impulse (e) none.

277) Workdone is defined as (a) The vector product of force and displacement in the direction of the force (c) the vector product of force and distance (d) the scalar product of force and energy (e) none.

278) Workdone by a force acting at an angle θ to move an object a distance s is given by (a)fxs (b) f.s (c) fscoθ (d) fssinθ (e) none.

279) Given that f = 2i + 4j + 7k and s = dxi + dyj + dzk find the workdone by the force (a) 13j (b) 2dx + 4dy + 7dz (c) 2dx + 8dy + k (e) none.

280) A force of 100N is applied to push a load through 50m. what is the workdone (a)50j (b) 500j (c) 5000j (d) 50,000j (e) none.

281) A body of weight 500N falls freely through a height of 100m what is the workdone (a)20kj (b) 500kj (c) 50kj (d) 200kj (e) none.

282) A 20kg lady jumps into a floor of height 5m, if her knee bends at a distance of 4m calculate the force on the knee (Take g = 10m/s^2) (a) 200N (b) 300N (c) 350N (d)250N (e) None.

283) A 0.5kg mango falls from a height of 5m to the ground. If the pull of gravity on a mass of 1kg is 10Newtons, calculate the workdone by gravity on the mango (a)30j (b)25j (c) 40j (d) 55j (e) none.

284) One thousand joules of work is done in moving a block a distance of 10m across a level floor. Calculate the force of the block (a)200N (b) 30N (c) 100N (d) 200N (e) none.

285) If the earth exerts a force of 3 x 10^9N on the moon and the moon travels 2.5 x 10^{10}m each time it orbits the earth. How much work does the earth do on the moon in each orbit? (a)3.0 x 1029j (b) 7.5 x 10^{29}j (c) 8.4 x 10^{29}j (d) 4.0 x 10^{29}j (e) none.

286) The unit of energy is (a) joule (b) watt

(c)Newton (d) N/j (e) none.

287) The energy a body has by virtue of its motion is called (a)Kinetic energy (b)potential energy (c) Rest Energy (d)Electrical energy € none.

288) The energy a body possesses by the virtue of its position is called (a) kinetic energy (b)potential energy (c) Rest energy (d)electrical energy (e) none.

289) The energy a body possesses by virtue of its mass alone is called (a) kinetic energy (b) potential energy (c)Rest energy (d)electrical energy (e) none.

290) When a body is at an elevation, it has an energy called (a) Elastic potential energy (b)magnetic potential energy (c)gravitational potential energy (d)rest energy.

291) The wound springs possess (a) Elastic potential energy (b) magnetic potential energy (c) gravitational potential energy (d)Rest energy (e) none.

292) A magnet at rest in a magnetic field has (a)elastic potential energy (b)magnetic potential energy (c) gravitational potential energy (d) rest energy (e) none.

293) Calculate the kinetic energy when a body of 40kg moves through a distance of 10m in 5sec (a)20j (b) 30j (c) 25j (d) 80j (e)none.

294) If an object of mass 15kg is moving with a velocity of 6m/s calculate the kinetic energy and its momentum (a)270j and 90kgms-1 (b)30j and 50kgm/s (c) 270j and 50kgm/s (d) 30j and 90kgm/s (e) none.

295) An object of mass 15kg is halved at height of 1m above the ground for 15sec, the workdone within this period is (a)20j (b) 0 (c) 0.5j (d) 30j (e) none.

296) An object of mass 5kg is initially at rest, moves a distance of 10m. Calculate the force on the object if it attain a spaced of 5m/s (a) 20N (b) 60N (c) 5N (d) 15N (e)none.

297) A spring of constant k is stretched a distance X_I from the equilibrium position. How much work does this take (a) ½Ke (b) $^1/_2$ Kxi (c) ½ Kx_1^2 (d) ½ Ke^3 (e)none.

298) An elastic string of force constant 200Nm^{-1} is stretched through 0.8m within its elastic limit. Calculate the energy stored in the string (a) 640j (b) 80.0j (c) 128.0j (d) 160.0j (e) none.

299) A toy car of 0.1kg is pulled by a string if it is compressed 4cm and has a force constant of 250Nm. Find the velocity of the car (a) 3m/s (b) 5m/s (c) 10m/s (d)2m/s (e) none.

300) Please try to solve past questions by Mr Ohms page 65 number 38, 39 and 41.

301) A force of 20N is applied at an angle of 40^0 above the horizontal to a block that slide across a smooth. How much work is done in moving the block a distance of 35m (a)700j (b) 536j (c) 630j (d) 235j (e) none.

302) Power is defined as (a)capacity to exert a force (b) product of force and time (c)product of force and distance (d) energy expended per unit time (e) none.

303) The capacity to do work is called (a)Energy (b)power (c) workdone (d) impulse (e)none.

304) A boy whose weight is 320N walks up a Hight of stairs 10m high in 30 seconds. What power did he generate (a)505watt (b)230 watt (c) 106.7 watt (d) 203.4 watt (e)none.

305) A block of mass 42kg is lifted 6m in 20 seconds at a uniform velocity. What is the average power required (a) 400N (b) 420w (c)520w (d) 300w (e) none.

306) An engine raises 100kg of water through a height of 60m in 20 seconds. What is the power of the engine (Take g = 10m/s^2) (a)120000w (b) 300w (c) 333w (d) 300nw (e)none.

307) A car of mass 1000kg moving on a steady velocity of 1om/s has a total frictional force of 400N, find the power due to the engine (a)

300w (b) 4000w (c) 5000w (d)10w (e) none.

308) A sand drops vertically at a rate of 2kgls on a moving belt with a velocity of 0.1m/s calculate the extra power needed to keep the belt moving (Hint f = $\frac{m \times v}{t}$

309) Please my faxs try to solve past question on work energy and powers.