BRAINWARE UNIVERSITY

Term End Examination 2021 - 22
Programme – Diploma in Electrical Engineering
Course Name – Engineering Mechanics
Course Code - DEE203
(Semester II)

Time allotted : 1 Hrs.15 Min. **Full Marks : 60**

[The figure in the margin indicates full marks.]

Group-A

(Multiple Choice Type Question) 1 x 60=60

Choose the correct alternative from the following :

(1) The unit of force in S.I. units is

a) kilogram b) newton

c) watt d) dyne

(2) The unit of work or energy in S.I. units is

a) newton b) kilogram meter

c) Pascal d) joule

(3) Forces are called coplanar when all of them acting on body lie in

a) one point b) one plane

c) different planes d) Perpendicular planes

(4) If an elevator travels at constant velocity, the normal reaction R is given as _____

a) m (g +a) b) m (g - a)

c) mg d) ma

(5) The motion of a particle round a fixed axis is

a) Translatory b) Circular

c) Rotary d) Both a. and b

(6) According to the principle of conservation of energy, under the action of _____ force, the sum of P.E and K.E of a particle remains constant.

a) conservative force b) dissipative force

c) frictional force d) air resistance force

(7) Work done by an engine in 6 sec is 1000 joules. What is the power generated by the engine in watt?

a) 1600 watt
b) 600watt
c) 166watt
d) 620watt

(8) What is the average resistance required to stop a truck of mass 600 kg in a distance of 30 m, if initial speed is 30 m/sec?

a) 8000 N
b) 9 kN
c) 9.5 kN
d) none of these

(9) What is the distance traveled by an electron in first 4 seconds from its initial position, if velocity time relation is given as v = 3t?

a) 12m
b) 10m
c) 15m
d) 24m

(10) The method of splitting a single force into two perpendicular components along x-axis and y-axis is called as _____

a) orthogonal resolution
b) orthogonal resolution
c) both a. and b
d) none option are correct

(11) For equilibrium the normal forces acts in which direction in the free body diagrams?

a) vertically Upward
b) vertically Downward
c) horizontally Right
d) horizontally Left

(12) For making the equilibrium equations the normal forces acts in which direction in the free body diagrams?

a) sideways
b) vertically Downward
c) horizontally Right
d) none of these

(13) Which one of the following statements is not correct?

a) the tangent of the angle of friction is equal to coefficient of friction
b) the angle of repose is equal to angle of friction
c) the tangent of the angle of repose is equal to coefficient of friction
d) the sine of the angle of repose is equal to coefficient to friction

(14) The three force system can also be in the equilibrium if:

a) All the forces are parallel to each other heading towards the same direction
b) The force components cancel each other
c) The forces are very small in magnitude
d) The forces are very huge in magnitude

(15) A smooth cylinder lying on its convex surface remains in _____ equilibrium

a) Stable
b) un-stable
c) this
d) none of this

(16) _____ is a horizontal structural member subjected to transverse loads perpendicular to its axis.

a) Column
b) Strut
c) Beam
d) Truss

(17) Fixed beam is also known as _____

a) Built on beam
b) Encastered beam
c) rigid beam
d) Tye beam

(18) U.D.L stands for?

a) Uniformly diluted length
b) Uniformly distributed loads
c) Uniformly developed loads
d) None of these

(19) Moving train is an example of ____ load.

a) Point load
b) Cantered load
c) Rolling load
d) Uniformly varying load

(20) A beam which extends beyond it supports can be termed as _____

a) Over hang beam
b) Over span beam
c) Tee beams
d) Isolated beams

(21) Units of U.D.L?

a) KN-m
b) . KN/m
c) KN
d) None of these

(22) A simple support offers only_____ reaction normal to the axis of the beam.

a) Horizontal
b) Vertical
c) Inclined
d) None of these

(23) Hinge support is called as _____

a) Socket joint
b) Socket joint
c) Pin joint
d) Ball joint

(24) For a simply supported beam, the moment at the support is always _____

a) Maximum
b) Zero
c) Minimum
d) None of this

(25) Hinged supports offers vertical and _____ reaction.

a) Horizontal
b) Rotation
c) Couple
d) None o these

(26) Which of the following statements is false about forces/couple?

a) Moment of couple is free vector
b) Resultant and equilibrant are equal in magnitude and direction
c) . Resultant of a couple is always zero
d) Parallelogram law is to be proved experimentally

(27) Which of the following is correct for the stability of equilibrium configuration?

a) The application of the conditions of the equilibrium of the body is valid only in the 2D
b) The application of the conditions of the equilibrium of the body is valid only in the 3D
c) The application of the conditions of the equilibrium of the body is valid only in the 3D
d) The application of the conditions of the equilibrium of the body is valid throughout

(28) The net moment of the body is zero that means the distance between the force and the rotational axis is zero thus the stability of equilibrium configuration.

a) The first part of the statement is false and other part is true
b) The first part of the statement is false and other part is false too
c) The first part of the statement is true and other part is false
d) The first part of the statement is true and other part is true too

(29) Moment equilibrium for the three force members will only be satisfied if_____

a) Three forces are in different dimensions
b) The forces are in the same direction
c) The forces are concurrent
d) The forces are perpendicular

(30) Load transfer by a beam is primarily by

a) bending only
b) shear only
c) bending and shear
d) neither bending nor shear

(31) A heavy ladder resting on floor and against a vertical wall may not be in equilibrium, if

a) the floor is smooth, the wall is rough
b) the floor is rough, the wall is smooth
c) the floor and wall both are smooth surfaces
d) the floor and wall both are rough surfaces

(32) The coefficient of friction depends on

a) area of contact
b) shape of surfaces
c) strength of surfaces
d) nature of surface

(33) The ratio of limiting friction and normal reaction is known as

a) coefficient of friction
b) angle of friction
c) angle of repose
d) sliding friction

(34) Which motion has magnitude of static frictional force directly proportional to normal reaction?

a) actual motion
b) impending motion
c) both a. and b
d) none of these

(35) On the ladder resting on the ground and leaning against a smooth vertical wall, the force of friction will be

a) downwards at its upper end
b) upwards at its upper end
c) perpendicular to the wall at its upper end
d) zero at its upper end

(36) Coefficient of friction is the

a) angle between normal reaction and the resultant of normal reaction and the limiting friction
b) ratio of limiting friction and normal reaction
c) the friction force acting when the body is just about to move
d) the friction force acting when the body is in motion

(37) Pick out the wrong statement about friction force for dry surfaces. Friction force is

a) proportional to normal load between the surfaces
b) dependent on the materials of contact surface
c) proportional to velocity of sliding
d) independent of the area of contact surfaces

(38) Limiting force of friction is the

a) tangent of angle between normal-reaction and the resultant of normal reaction and limiting friction
b) ratio of limiting friction and normal reaction
c) the friction force acting when the body is just about to move
d) the friction force acting when the body is in motion

(39) Dynamic friction as compared to static friction is

a) same
b) more
c) less
d) may be less of more depending on nature of surfaces and velocity

(40) Tangent of angle of friction is equal to

a) kinetic friction
b) limiting friction
c) angle of repose
d) coefficient of friction

(41) Kinetic friction is the

a) tangent of angle between normal reaction and the resultant of normal reaction and the limiting friction
b) ratio of limiting friction and normal reaction
c) the friction force acting when the body is just about to move
d) the friction force acting when the body is in motion

(42) Static friction is always

a) . Less than dynamic friction
b) Equal to dynamic friction
c) Greater that dynamic friction
d) Has no relation with dynamic friction

(43) Coefficient of friction depends upon

a) Area of contact only
b) materials of the resisting or contact surfaces
c) Nature of surface only
d) none of these

(44) Coulomb friction is the friction between

a) Two dry surfaces
b) Bodies having relative motion
c) Two lubricated surfaces
d) Solids and liquids

(45) The ratio of the limiting force of friction (F) to the normal reaction (R) is known as

a) sliding friction
b) kinetic friction
c) coefficient of friction
d) none of these

(46) The force of friction (F) is equal to

a) $2\mu R$
b) $\mu R/2$
c) μR
d) $\mu R/4$

(47) When the two surfaces in contact have a thick layer of lubricant in between them, it is known as

a) . solid friction
b) greasy friction
c) . rolling friction
d) film friction

(48) When the two surfaces in contact have a very thin layer of lubricant in between them, it is known as

a) . rolling friction
b) solid friction
c) film friction
d) dilute friction

(49) The force of friction is maximum when the surface

a) is at rest
b) is on the point of motion
c) is moving
d) the friction remains same at all points

(50) The center of gravity of a uniform lamina lies at

a) the center of heavy portion
b) the bottom surface
c) the mid-point of its axis
d) none of these

(51) The C.G. of a right circular solid cone of height h lies at the following distance from the base

a) h/2
b) h/6
c) h/3
d) h/4

(52) From a circular plate of diameter 6 cm is cut out a circle whose diameter is a radius of the plate. Find the C.G. of the remainder from the center of circular plate

a) 0.5 cm
b) 1.0 cm
c) 1.5 cm
d) 2.5 cm

(53) Pick up the incorrect statement from the following :

a) The C.G. of a circle is at its center
b) The C.G. of a triangle is at the intersection of its medians
c) The C.G. of a rectangle is at the inter-section of its diagonals
d) The C.G. of a semicircle is at a distance 0.23 mm from its base

(54) If a material has no uniform density throughout the body, then the position of centroid and

center of mass are _____

a) identical
b) not identical
c) independent upon the density
d) unpredictable

(55) Which of the following laminas do not have centroid at its geometrical centre?

a) Circle
b) Equilateral triangle
c) Right angled triangle
d) none of these

(56) The point through which the whole weight of the body acts is called _____

a) Inertial point
b) Centroid
c) Center of gravity
d) Centroidal axis

(57) The point at which the total area of a plane figure is assumed to be concentrated is called

a) Centre of gravity
b) Central point
c) Mid point
d) None of these

(58) Where will be the centre of gravity of a uniform rod lies?

a) At its end
b) At its centre of its cross sectional area
c) At its middle point
d) None of these

(59) What is the unit of radius of gyration?

a) m4
b) N
c) m
d) None of these

(60) Which of the following force(s) is a type of conservative force

a) frictional force
b) gravity force
c) centrifugal force
d) none of these