c) Effort between the fulcrum and load
d) Load and effort acting at the same point

7. In class-II levers

a) M.A = V.R
b) M.A > V.R
c) M.A >1
d) M.A < 1

8. Pulley is a_____ machine.

a) Simple
b) Complex
c) Rotational
d) None of these

9. A nut that can be broken by applying a force of 40 Kgf is broken by placing a 20 cm long nut cracker at a distance of 2 cm from the hinge. Calculate the minimum force needed to break the nut?

a) 8 Kgf
b) 5 Kgf
c) 6 Kgf
d) 4 Kgf

10. A movable pulley is used as:

a) A speed multiplier
b) A force multiplier
c) An energy multiplier
d) None of these

11. A single fixed pulley is used because

a) its mechanical advantage > 1
b) its velocity ratio < 1
c) it gives 100% efficiency
d) it helps to apply the effort in a convenient direction

12. The mechanical advantage of an ideal pulley is:

a) 1
b) 2
c) Less than 2
d) Less than 1

13. The velocity ratio of a combination of *n* moveable pulleys with a fixed pulley is always *2n*. Choose the appropriate option.

a) True
b) False
c) Maybe
d) Not sure

14. A woman draws water from a well using a fixed pulley. The mas of the bucket and water together is 6 kg. The Force applied by the woman is 670 N. The Mechanical Advantage will be

a) 1.85
b) 1.16

ICSE (MCQ) SEM I
www.newtongateacademy.com

c) 0.857
d) 2.16

15. A pulley system with velocity ratio 4 is used to lift a load of 150 kgf through a vertical height of 20 m. The effort required is 50 Kgf in the downward direction. Calculate the distance moved by the effort.

a) 40 m
b) 80 m
c) 160 m
d) 800 m

16. Efficiency of a machine is:

a) output + input
b) output – input
c) output / input
d) output × input

17. Efficiency of a machine is:

a) M.A./V.R.
b) V.R./M.A.
c) M.A. × V.R.
d) None of these

18. Mechanical Advantage (M.A), Load (L) and Effort (E) are related as:

a) M.A. = × E
b) M.A × E = L
c) E = M.A. × L
d) None of these

19. Which of the following statements is not true for a machine:

a) It always has efficiency less than 100%.
b) Its mechanical advantage can be less than 1.
c) It can also be used as a speed multiplier.
d) It can have a mechanical advantage greater than the velocity ratio.

20. A crowbar of length 120 cm has its fulcrum situated at a distance of 20 cm from the load. Calculate the mechanical advantage of the crowbar.

a) 5
b) 6
c) 7
d) 8

21. A pair of scissors has its blades 15 cm long, while its handles are 7.5 cm long. What is its mechanical advantage?

a) 0.55
b) 0.15
c) 0.5
d) 0.4

22. A force of 5 kgf is required to cut a metal sheet. The shears used for cutting the metal sheet has 5m long blades, while its handle is 10cm long. What effort is needed to cut the sheet?

a) 2.5 Kgf
b) 3.5 Kgf

ICSE (MCQ) SEM I
www.newtongateacademy.com

c) 1.5 Kgf
d) 0.5 Kgf

23. The mechanical advantage of an ideal single movable pulley is:

a) 1
b) 2
c) less than 2
d) less than 1

24. In a block and tackle system consisting of 3 pulleys, a load of 75 kgf is raised with an effort of 25 kgf.

Find: (i) the Mechanical Advantage, (ii) Velocity Ratio and (iii) Efficiency.

a) MA=3, VR=1, E=1
b) MA=1, VR=3, E=1
c) MA=3, VR=3, E=1
d) MA=1, VR=3, E=3

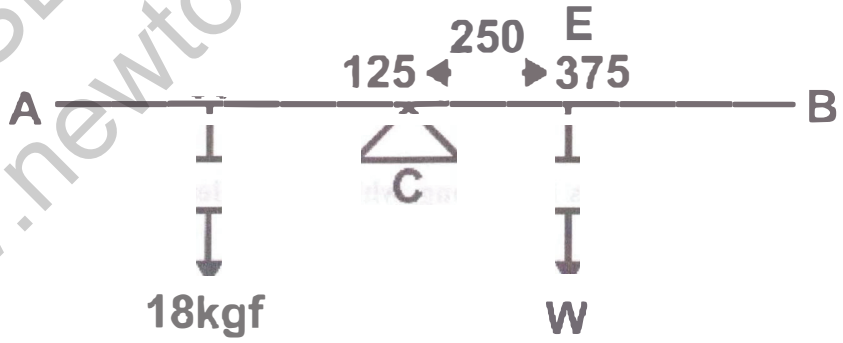
25. A pulley system has three pulleys. A load of 240N is overcome by applying an effort of 100N. Calculate the mechanical advantage and efficiency of this system.

a) MA=2.4,VR=80%
b) MA=2.5,VR=80%
c) MA=2.4,VR=90%
d) MA=2.4,VR=85%

26. In an ideal machine,

a) the power input is equal to the power output of the device
b) the power input is more to the power output of the device
c) the power input is less than the power output of the device
d) none of the above

27. A 4 m long rod of negligible weight is to be balanced about a point 125 cm from its one end. A load of 18 kgf is suspended at a point 60 cm from the support on the shorter arm. A weight W is placed 250 cm from the support on the longer arm. Find W.



a) 4.32 kgf
b) 4.33 kgf
c) 4.02 kgf
d) 4.03 kgf

28. The relationship between M.A. and V.R. for an ideal machine is

ICSE (MCQ) SEM I
www.newtongateacademy.com

a) M.A. = V.R.
b) M.A. < V.R.
c) M.A. > V.R.
d) M.A. ≤ V.R.

29. The relationship between M.A. and V.R. for a practical machine is

a) M.A. = V.R.
b) M.A. < V.R.
c) M.A. > V.R.
d) M.A. ≤ V.R.

30. A simple machine that can be used to multiply force.

a) Nutcracker
b) Single fixed pulley
c) Both a & b
d) None of the above

31. A simple machine that can be used to change the direction of force applied.

a) Nutcracker
b) Single fixed pulley
c) Both
d) None of these

32. What is the main energy transformation that occurs in charging a battery?

a) Electrical energy to chemical energy.
b) Electrical energy to heat energy.
c) Chemical energy to light energy
d) Light energy to chemical energy

33. A pulley system with V.R. = 4 is used to lift a load of 175 kgf through a vertical height of 15 m. The effort required is 50 kgf in the downward direction. (g = 10 N/kg) Calculate:

1. Distance moved by the effort
2. Work done by the effort
3. M.A. of the pulley system
4. Efficiency of the pulley system

a) d_E = 60 m W=30,000 J M.A.=3.5 E=87.5%
b) d_E = 50 m W=30,000 J M.A.=3.5 E=87.5%
c) d_E = 60 m W=40,000 J M.A.=3.5 E=87.5%
d) d_E = 60 m W=30,000 J M.A.=4.5 E=87.5%

34. Aditya exerts a pull of 150 gf. What is the maximum load he can raise with this pulley system if its efficiency = 75%? (Assume VR = 5)

a) 563.5kgf
b) 562.5kgf
c) 564.5 kgf
d) 565.5 kgf

35. In a pulley system

a) The ideal mechanical advantage is equal to the number of rope segments.
b) The ideal mechanical advantage is more than the number of rope segments.

ICSE (MCQ) SEM I
www.newtongateacademy.com

c) The ideal mechanical advantage is less than the number of rope segments.
d) There is no relation between mechanical advantage and number of rope segments.

36. The velocity ratio of a single movable pulley is

a) 2
b) < 2
c) > 2
d) 1

37. In a ceiling fan

a) Electrical energy changes to mechanical energy.
b) Electrical energy changes to chemical energy.
c) Electrical energy changes to heat energy.
d) Chemical energy changes to light energy.

38. Velocity ratio of a single movable pulley is

a) 1
b) 2
c) 3
d) 4

39. In a single movable pulley, if the effort moves by a distance x upwards, by what height is the load raised?

a) The load is raised to a height of x/2
b) The load is raised to a height of x/3
c) The load is raised to a height of 2x
d) The load is raised to a height of 2/x

40. A pulley system has a velocity ratio of 4 and efficiency 90%. Choose a correction option to indicate

i. The mechanical advantage of the system
ii. The effort required to raise a load of 300 N by this system

a) M.A.=3.6 E=83.33
b) M.A.=3.6 E=82.33
c) M.A.=3.4 E=83.33
d) M.A.=3.4 E=82.33

41. Name a machine which is used to multiply speed

a) movable pulley
b) gear system or class III lever
c) single fixed pulley
d) all of the above

42. Name a machine which is used to change the direction for force applied

a) movable pulley
b) gear system or class III lever
c) single fixed pulley
d) all of the above

ICSE (MCQ) SEM I
www.newtongateacademy.com

43. The velocity ratio of a combination of *n* movable pulleys with a fixed pulley is always

a) 2n
b) n
c) n^2
d) 2^n

44. The velocity ratio of a block and tackle system is always equal to the number of strands of the tackle supporting the load. Choose an appropriate option

a) True
b) False
c) It may or may not
d) None of the above

45. A Single fixed pulley is used because it:

a) has a mechanical advantage greater than 1.
b) has a velocity ratio less than 1
c) gives 100% efficiency
d) helps to apply the effort in a convenient direction.

46. The mechanical advantage of an ideal single movable pulley is:

a) 1
b) 2
c) less than 2
d) less than 1

47. A Woman draws water from a well using a fixed pulley. The mass of bucket and water together is 6 kg. The force applied by woman is 70 N. The mechanical advantage is *(Take g = 10 ms^{-2})*

a) 0.858
b) 0.857
c) 0.867
d) 0.886

48. The efficiency of a single movable pulley system is not 100% because

a) The friction of the pulley bearing is not zero.
b) The weight of the pulley and string is not zero.
c) Both a and b
d) None of these

49. A load of 100 kg falling through 8 m in 4 seconds, drives a machine whose efficiency is 0.75. Calculate the input and output powers of the machine.

a) 1960 W,1470 W
b) 1966 W,1470 W
c) 1987 W,1471 W
d) 1988 W ,1462 W

50. A combination of a movable pulley P_1 with a fixed pulley P_2 is used for lifting up a load of 20 kgf. The effort applied at the free end of the string, neglecting the weight of the pulley P1 and friction is

a) 9.8 N
b) 98 N
c) 98 kgf
d) 10 N

ICSE (MCQ) SEM I
www.newtongateacademy.com