RAILWAY RECRUITMENT BOARD

RRB

GENERAL SCIENCE

Rapid Fire

CHAPTERWISE POINTER

Numerical & Pictorial Question Bank

USEFUL FOR - ◆ALP ◆Technician ◆RPF Constable ◆SI ◆JE ◆NTPC ◆Group D & Other Competitive Exams

Chief Editor
A.K. Mahajan

Compiled & Written by
Anand Sony, Rajkaran Patel, Rasbihari

Computer Graphics by
Balkrishna & Pankaj Kushwaha

Editorial Office
12, Church Lane Prayagraj-211002
: 9415650134
Email : yctap12@gmail.com
website : www.yctbooks.com/www.yctfastbook.com/ www.yctbooksprime.com

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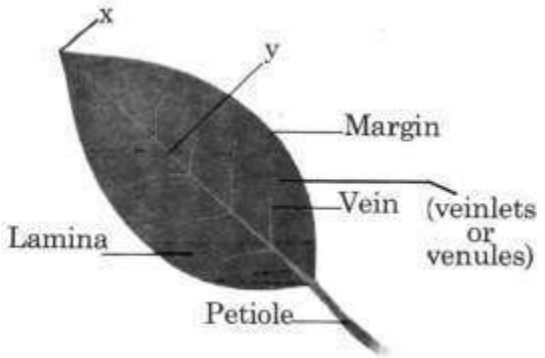
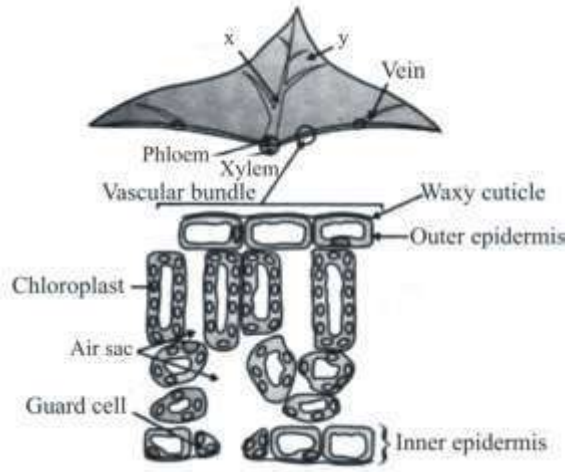
BIOLOGY RELATED IMPORTANT PICTORIAL MCQ

1. What do x and y depicts in the following figure?



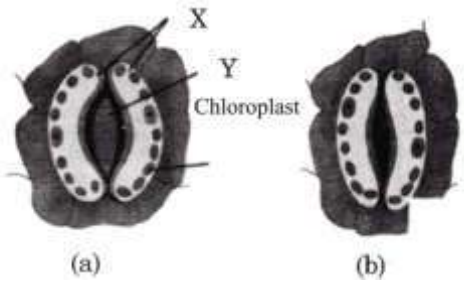
(a) Midrib, Margin (b) Vein, Lamina
(c) Tip, Midrib (d) Margin, Vein

2. What do x and y depicts in the following figure?



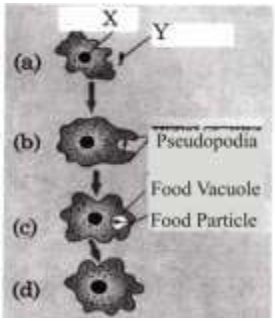
(a) Auxiliary bud, Stipule
(b) Midrib, Leaf blade
(c) Guard cell, stomata pore
(d) Petiole, Lamina

3. What are the names of x and y in the following figure?



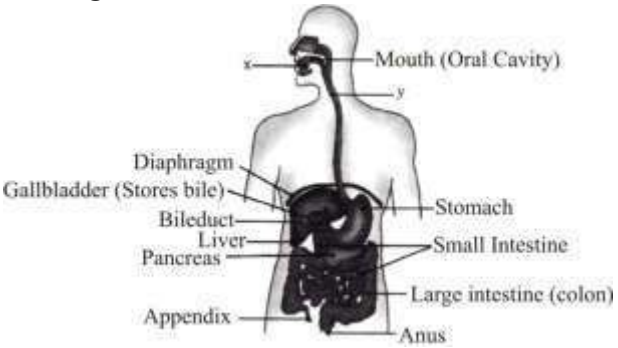
(a) Leaf blade, Stomata pore
(b) Guard cells, Air sac
(c) Chloroplast, Vein
(d) Guard Cells, Stomata pore

4. What do x and y depicts in the following figure?



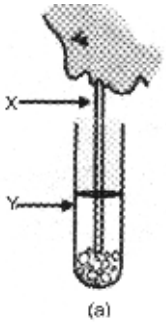
(a) Nucleus and Food particle
(b) Food Vacuole and Pseudopodia
(c) Food particle and Air sac
(d) Nucleus and Appendages

5. What are the names of x and y in the following figure?



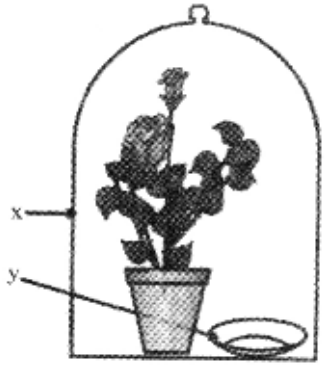
(a) Teeth and Pancreas
(b) Tongue and Oesophagus
(c) Teeth and Pharynx
(d) Tongue and Larynx

6. What are the names of x and y in the following figure?



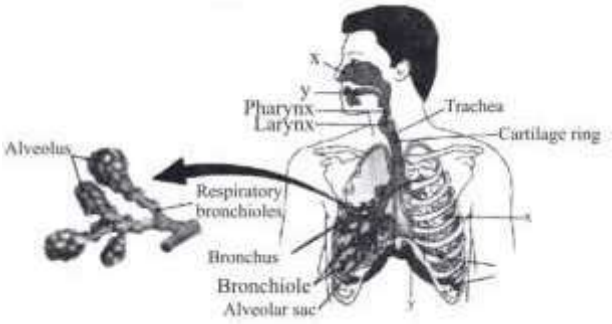
(a) Tube and Lime water in test tube
(b) Rubber tube and syringe
(c) Tube and Syringe
(d) Tube and rubber tube

7. What are the names of x and y in the following figure?



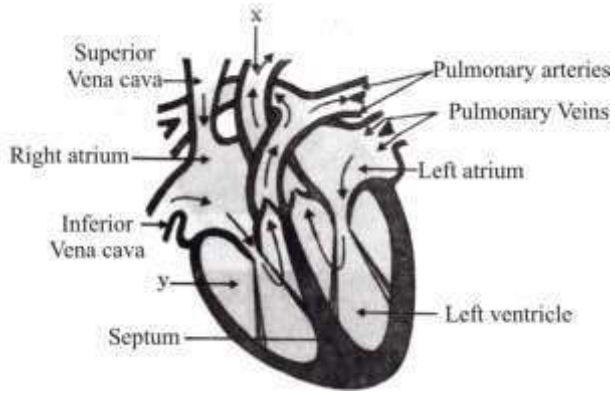
(a) Bell jar and potassium hydroxide in watch glass
(b) Watch glass and variegated leaf
(c) Leaf and Plate
(d) Tube and Bell jar

8. Which organs of the body do x and y depicts in the following figure?



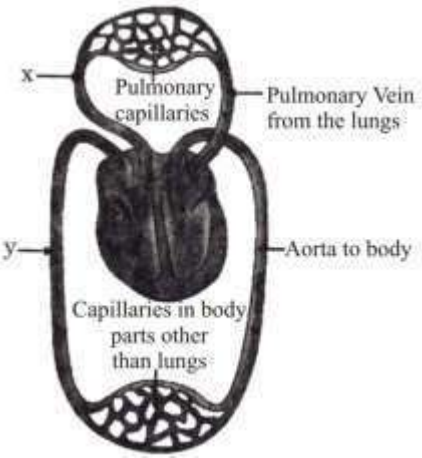
(a) Aorta and Vein
(b) Trachea and Lungs
(c) Nostril and Oral cavity
(d) Urinary bladder and Bronchus

9. What do x and y depicts in the following figure?



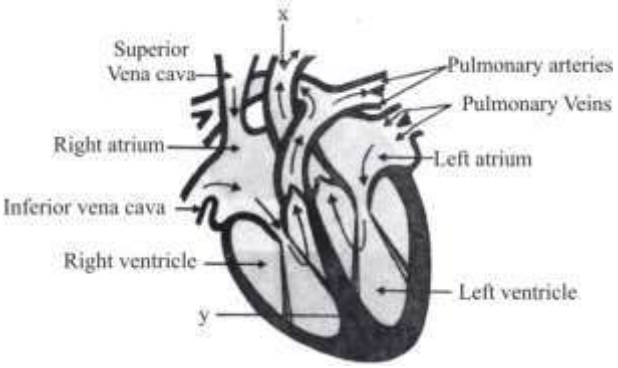
(a) Aorta and Right Ventricle
(b) Left Ventricle and septum
(c) Pulmonary vein and Right atrium
(d) Left atrium and Right Ventricle

10. What do x and y depicts in the following figure?



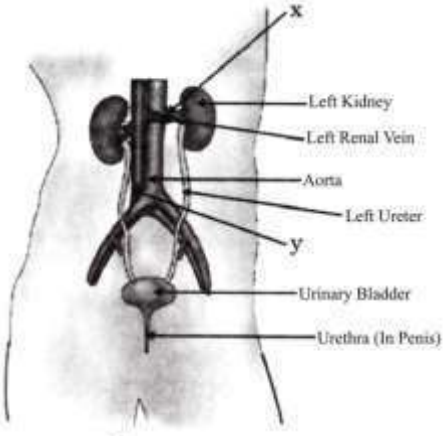
(a) Pulmonary vein and Artery
(b) Aorta and Vena cava
(c) Pulmonary artery to the lungs and Vena cava from the body
(d) Right atrium and Left Ventricle

11. What are the names of x and y in the following figure?



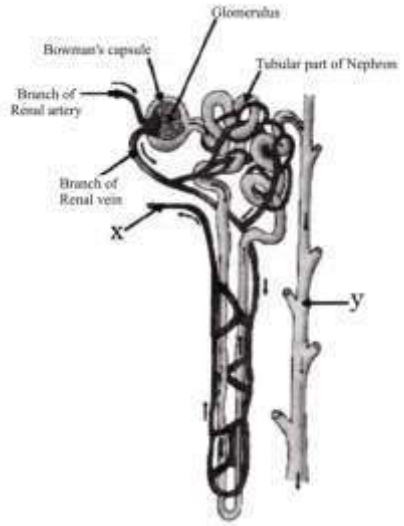
(a) Left Ventricle, Septum
(b) Right Ventricle, Aorta
(c) Right atrium, Left Ventricle
(d) Aorta and Septum

12. What do x and y depicts in the following figure?



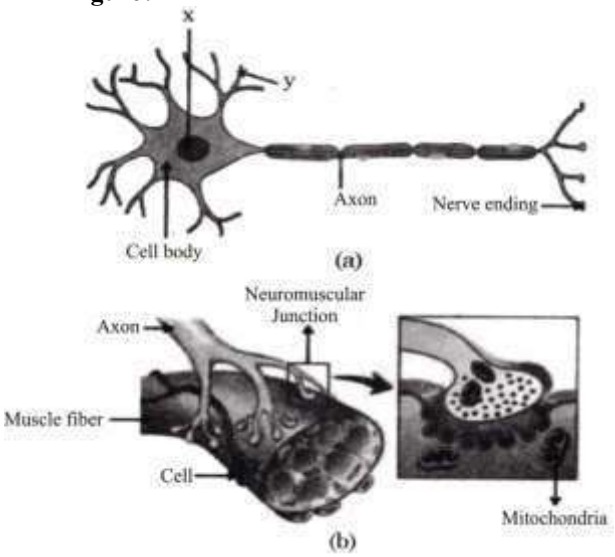
(a) Bowman's Capsule and Collecting duct
(b) Left Kidney and Vena Cava
(c) Urinary Bladder and Renal Artery
(d) Left Renal Artery and Vena Cava

13. What are the names of x and y in the following figure?



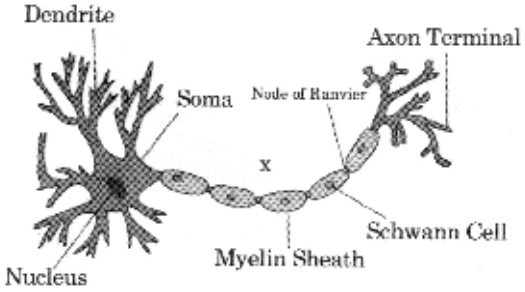
(a) Bowman's capsule and Aorta
(b) Aorta and Vein
(c) Renal Artery and Collecting duct
(d) Urinary bladder and Vena Cava

14. What are the names of x and y in the following figure?



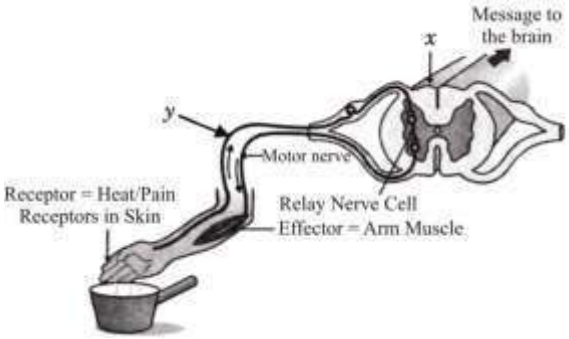
(a) Lysosome and Golgi body
(b) Nucleus and Mitochondria
(c) Nucleolus and Dendrite
(d) Fiber and Filament

15. What does x depict in the following figure?



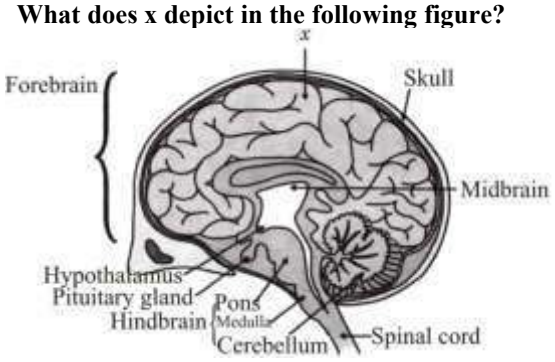
(a) Capillary (b) Axon
(c) Nucleus (d) Cell body

16. What do x and y depicts in the following figure?



(a) Dendrite and Nucleus
(b) Cell body and Axon
(c) Spinal cord and sensory nerve cell
(d) Fore brain and spinal cord

17. What does x depict in the following figure?

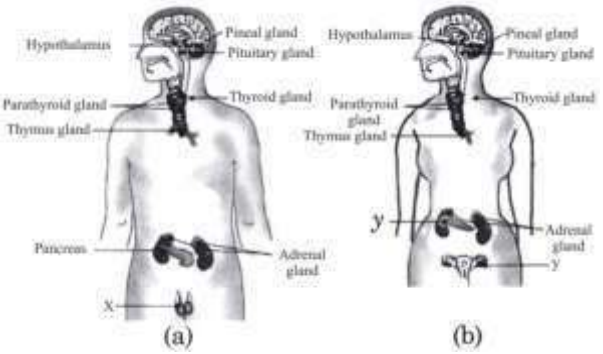


(a) Spinal cord (b) Nucleus
(c) Axon (d) Cerebrum

18. What does x depicts in the following figure?

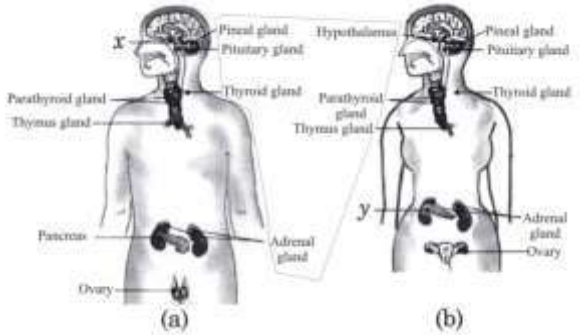
(a) Negative geotropism (b) Positive geotropism
(c) Equal geotropism (d) Cellular geotropism

19. What do x and y depicts in the following figure?



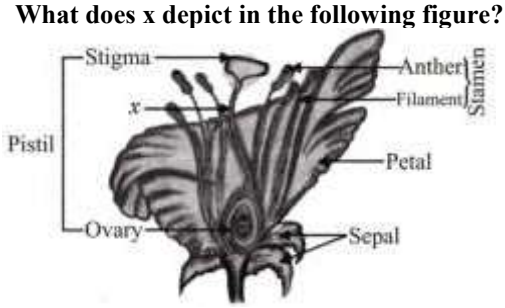
(a) Forebrain and Midbrain
(b) Testis and Ovary
(c) Prostate gland and fallopian tube
(d) Hymen and Testis

20. Which organs of the body do x and y depicts in the following figure?



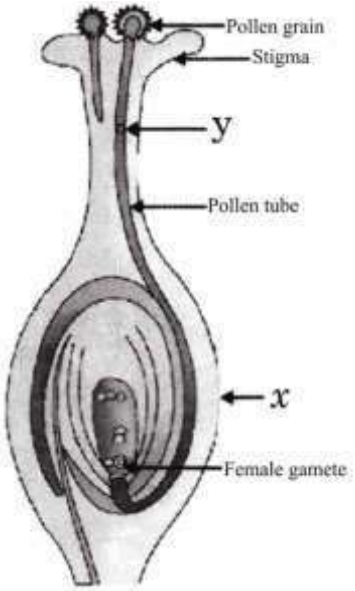
(a) Pancreas and Adrenal gland
(b) Hypothalamus and Pancreas
(c) Pituitary gland and Hypothalamus
(d) Hormone and Pituitary gland

21. What does x depict in the following figure?



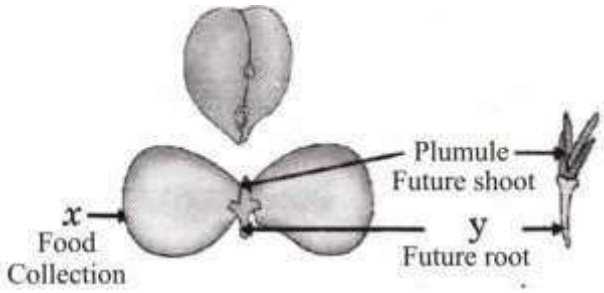
(a) Ovary (b) Style
(c) Pollen tube (d) Female gamete

22. What are the names of x and y in the following figure?



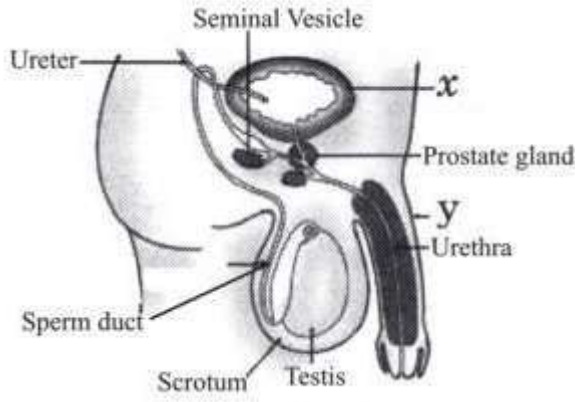
(a) Ovary, Sepal
(b) Style, Filament
(c) Male gamete, Ovary
(d) Ovary, Male gamete

23. What are the names of x and y in the following figure?



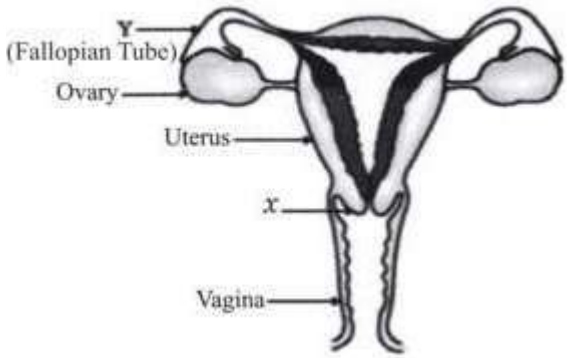
(a) Radicle and pollen grain
(b) Cotyledon and Radicle
(c) Radicle and cotyledon
(d) Ovary and Pollen tube

24. Which organs of the body do x and y depicts in the following figure?



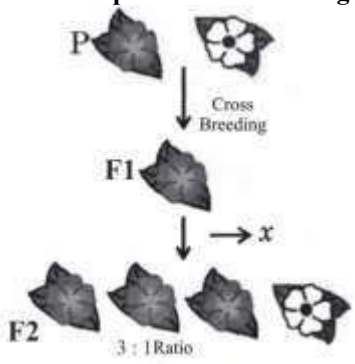
(a) Pancreas and urinary bladder
(b) Gall bladder and Kidney
(c) Urinary bladder and Penis
(d) Penis and Urinary bladder

25. Which organs of the body do x and y depicts in the following figure?



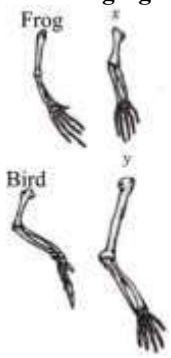
(a) Cervix and Oviduct
(b) Urinary bladder and Ovary
(c) Seminal vesicle and ureter
(d) Vagina and Cervix

26. What does x depicts in the following figure?



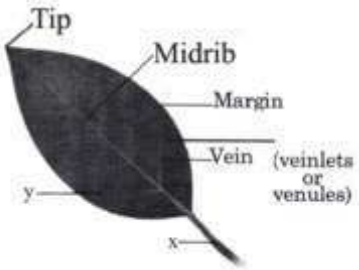
(a) Cross breeding (b) Cross pollination
(c) Self fertilization (d) Un-fertilization

27. What is the homologous organ of frog and bird similar in the following figure?



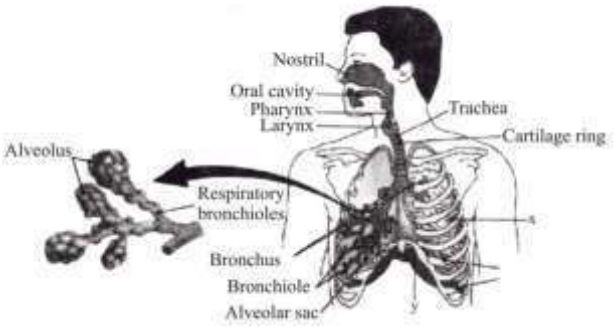
(a) Dog and human (b) Bat and pigeon
(c) Lizard and human (d) Cat and monkey

28. What do x and y depicts in the following figure?



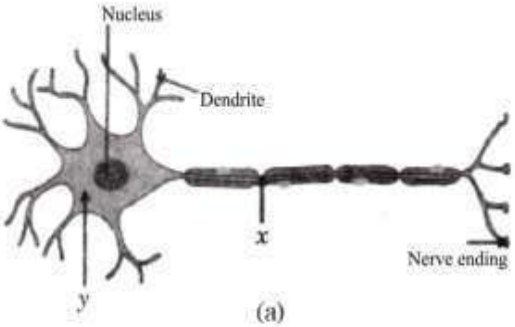
(a) Midrib, Margin (b) Vein, Lamina
(c) Petiole, Lamina (d) Tip, vein

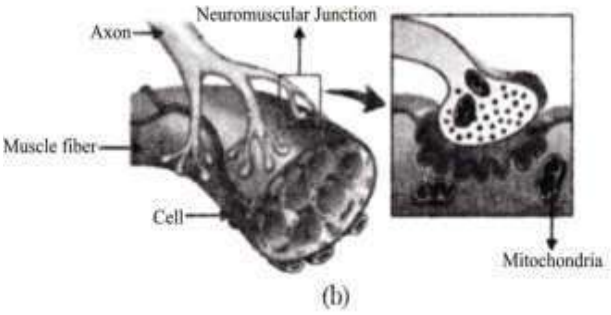
29. Which organs of the body do x and y depicts in the following figure?



(a) Aorta, Vein
(b) Lungs, Diaphragm
(c) Urinary bladder, Bronchus
(d) Pharynx, Lungs

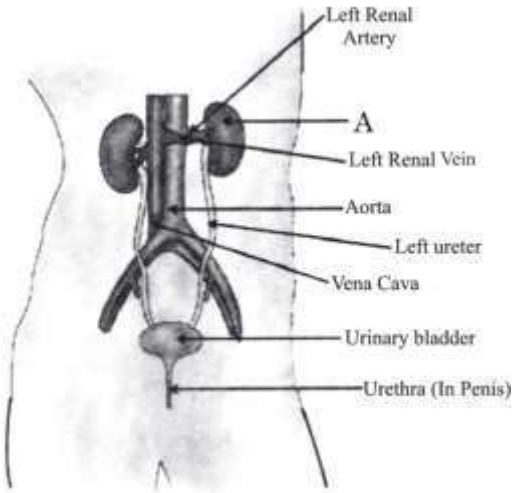
30. What are the names of x and y in the following figure?





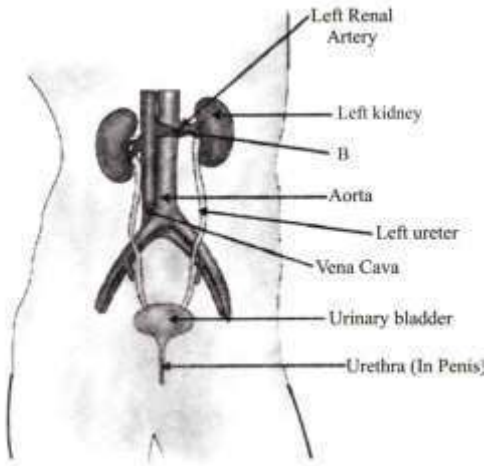
(a) Lysosome and Golgi body
(b) Fiber and Filament
(c) Nucleus and Dendrite
(d) Axon and Cell body

31. What does A depicts in the figure?



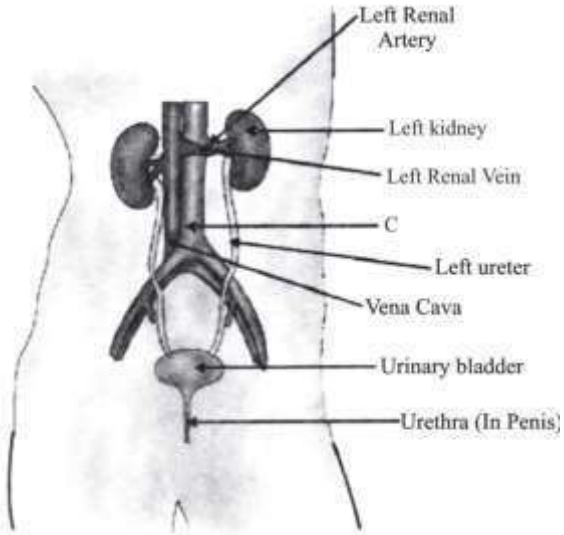
(a) Right Kidney
(b) Left Kidney
(c) Lungs
(d) Pancreas

32. What does B depicts in the figure?



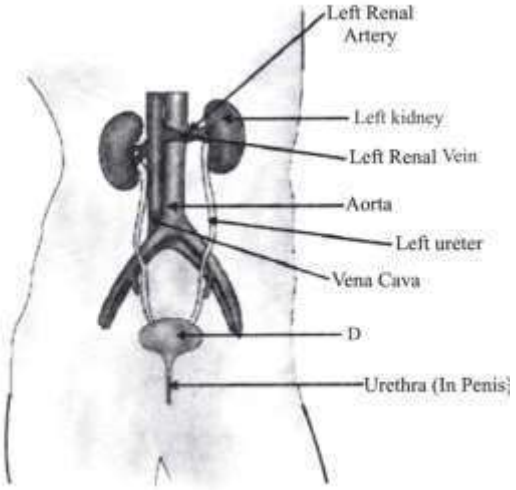
(a) Left Renal Vein (b) Right Renal Vein
(c) Lungs (d) Kidney

33. What does C depicts in the figure?



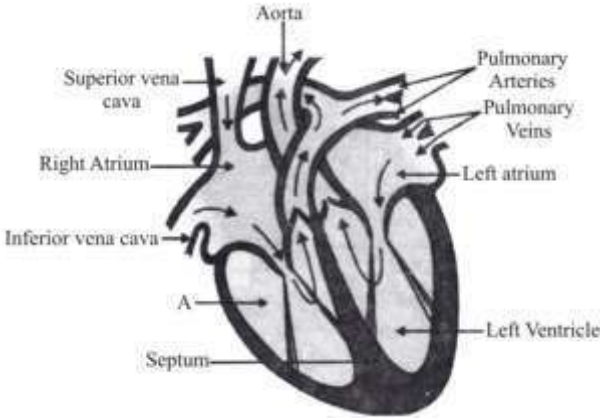
(a) Urinary bladder (b) Pancreas
(c) Aorta (d) Vein

34. What does D depicts in the figure?



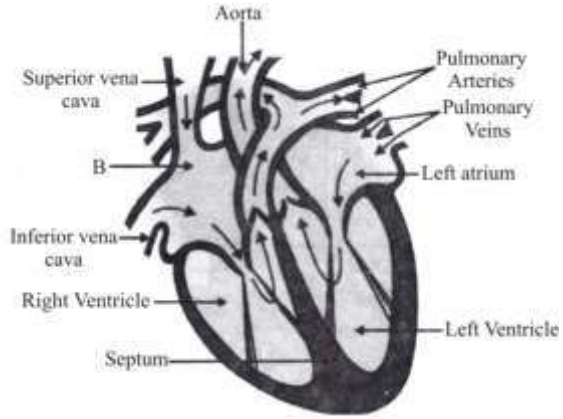
(a) Rectum (b) Urinary bladder
(c) Pancreas (d) Aorta

35. What is the name of A in the figure?



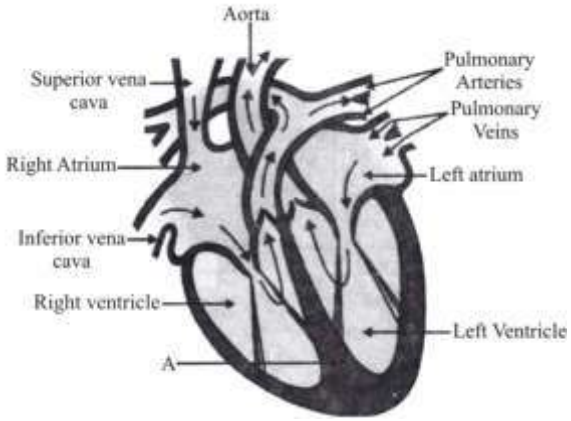
(a) Left Ventricle (b) Left atrium
(c) Right Ventricle (d) None

36. What is the name of B in the figure?



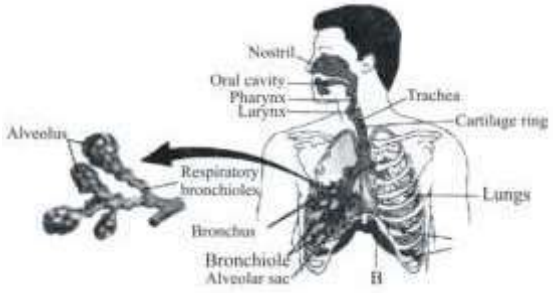
(a) Right atrium (b) Left atrium
(c) Right ventricle (d) Left ventricle

37. What is the name of A in the figure?



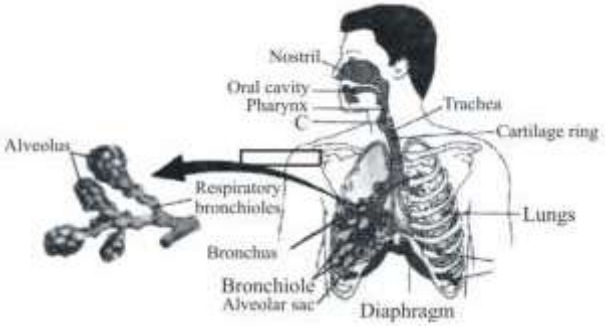
(a) Left ventricle (b) Right ventricle
(c) Left atrium (d) Septum

38. What is the name of B in the figure?



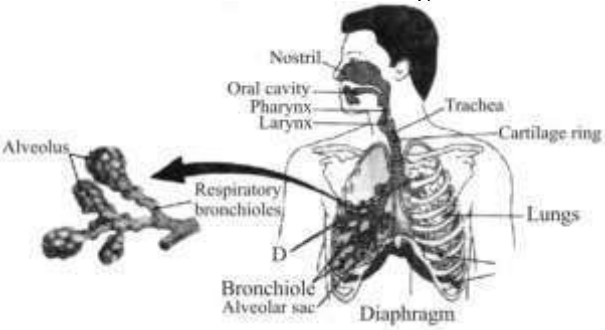
(a) Lungs (b) Pancreas
(c) Stomach (d) Diaphragm

39. What is the name of C in the figure?



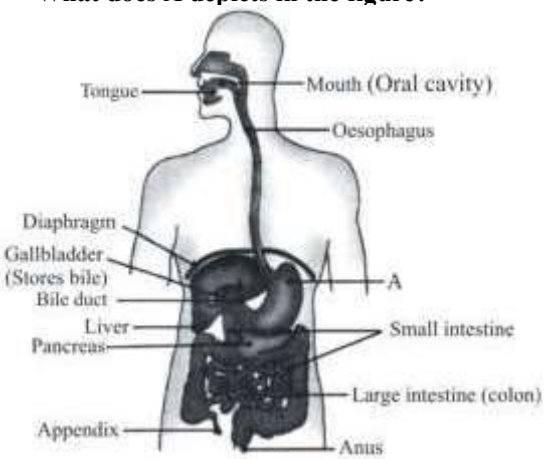
(a) Pharynx (b) Bronchi
(c) Alveoli (d) Larynx

40. What is the name of D in the figure?



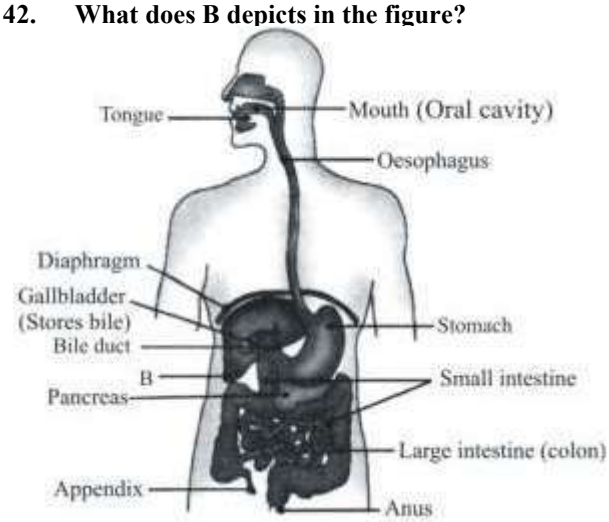
(a) Lungs (b) Bronchus
(c) Kidney (d) Larynx

41. What does A depicts in the figure?



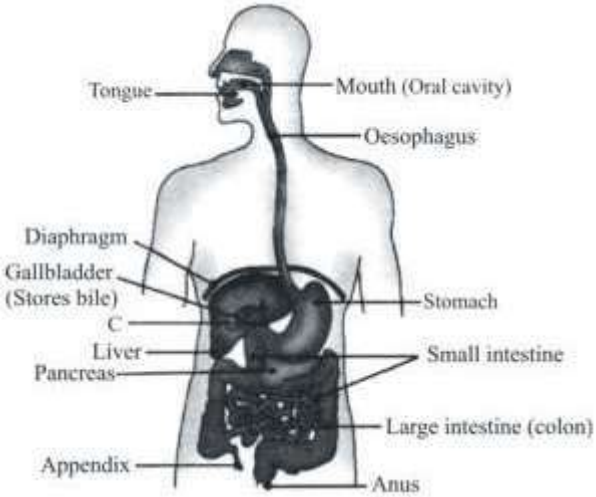
(a) Pancreas (b) Kidney
(c) Stomach (d) Liver

42. What does B depicts in the figure?



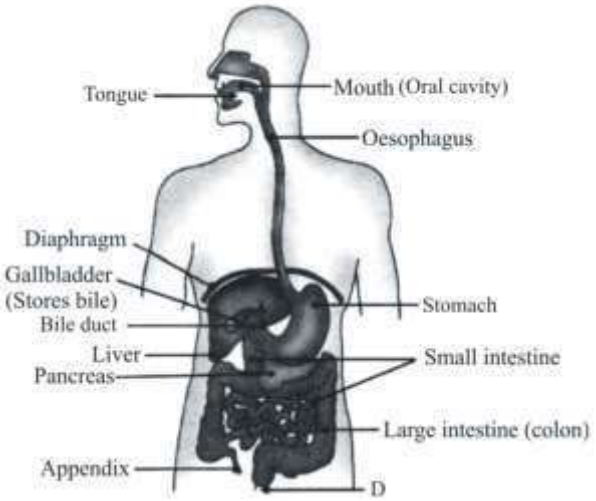
(a) Liver (b) Kidney
(c) Heart (d) Lungs

43. What does C depicts in the figure?



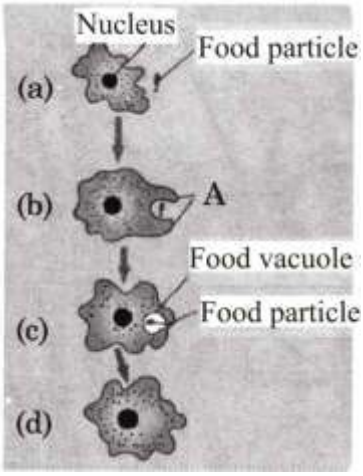
(a) Small intestine (b) Large intestine
(c) Bile duct (d) Trachea

44. What is the name of D in the figure?



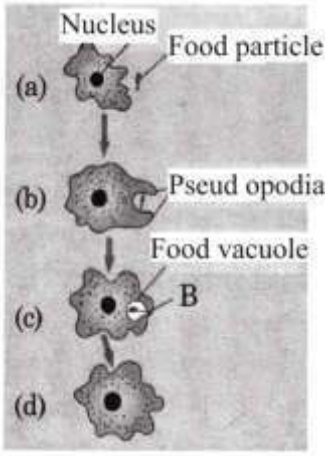
(a) Urinary bladder (b) Rectum
(c) Anus (d) Stomach

45. What is the name of A in the figure?



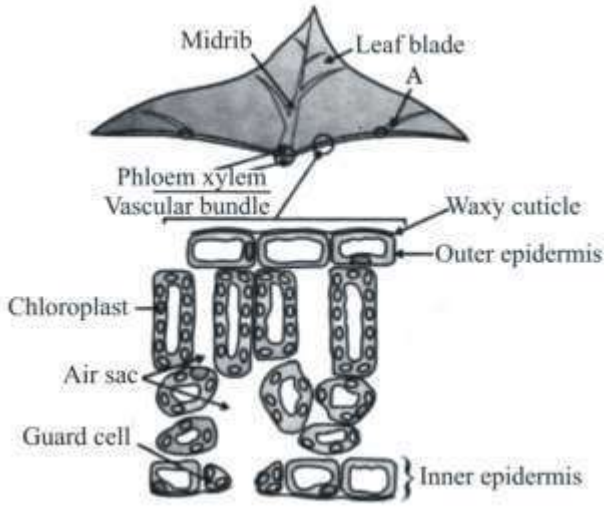
(a) Stomach (b) Fragmentation
(c) Pseudopodia (d) Fertilization

46. What is the name of B in the figure?



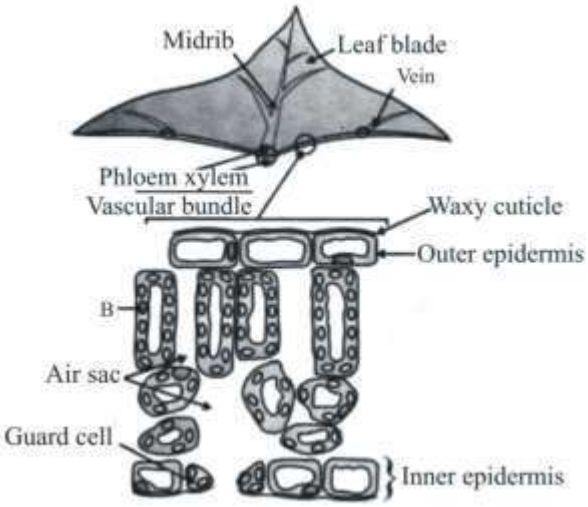
(a) Food particle (b) Elementary particle
(c) Physical particle (d) None

47. What is the name of A in the figure?



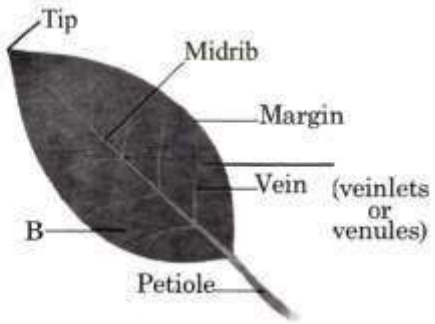
(a) Artery
(b) Vein
(c) Stem
(d) Leaf

48. What is the name of B in the figure?



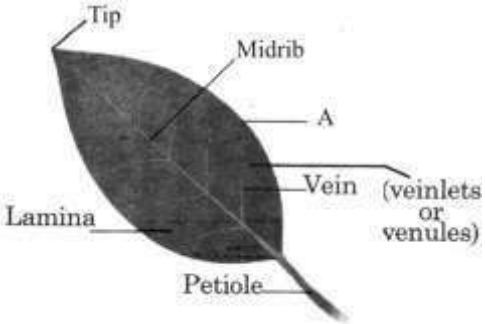
(a) Leaf plastid
(b) Fungal plastid
(c) Chloroplast
(d) None

49. What is the name of B in the figure?



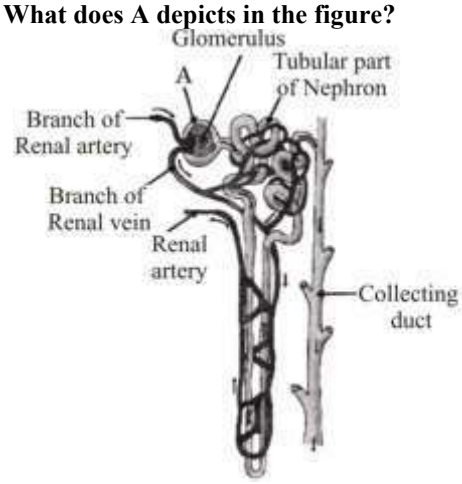
(a) Tip
(b) Iris
(c) Lamina
(d) Midrib

50. What does A depicts in the figure?



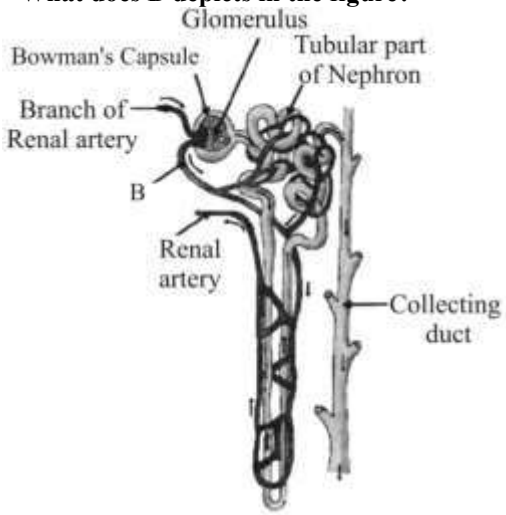
(a) Margin (b) Code
(c) Median angle (d) Leaf

51. What does A depicts in the figure?



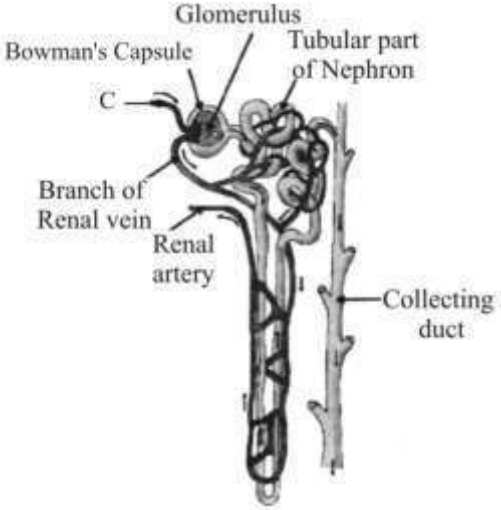
(a) Stomach (b) Liver
(c) Bowman's capsule (d) Lungs

52. What does B depicts in the figure?



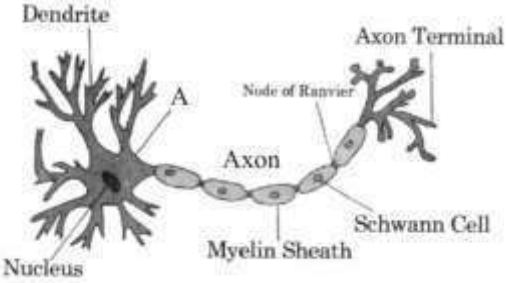
(a) Branch of Renal artery
(b) Branch of Renal vein
(c) Branch of Hepatic artery
(d) Branch of Hepatic vein

53. What does C depicts in the figure?



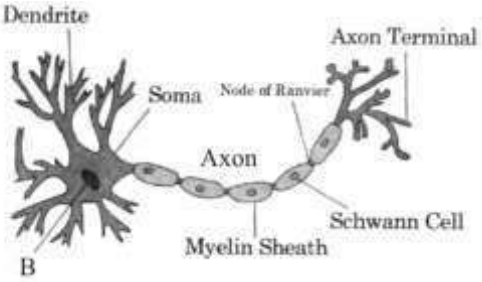
(a) Branch of Renal artery
(b) Branch of Renal vein
(c) Branch of Hepatic artery
(d) Branch of Hepatic vein

54. What does A depicts in the figure?



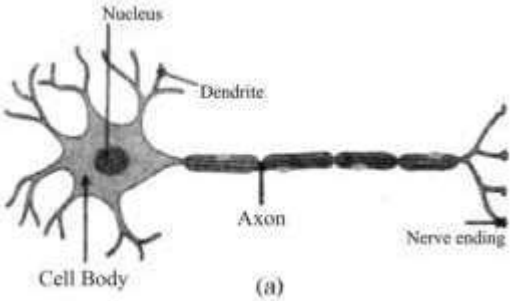
(a) Gamma
(b) Beta
(c) Roma
(d) Soma

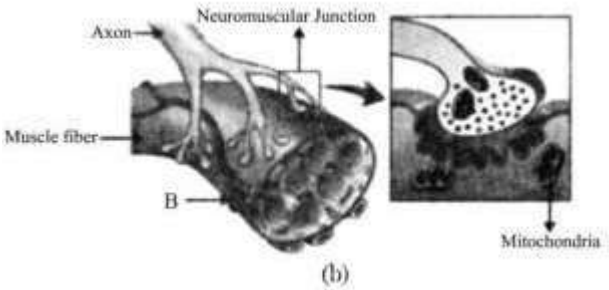
55. What does B depicts in the figure?



(a) Nucleus
(b) Vein
(c) Artery
(d) Lysosome

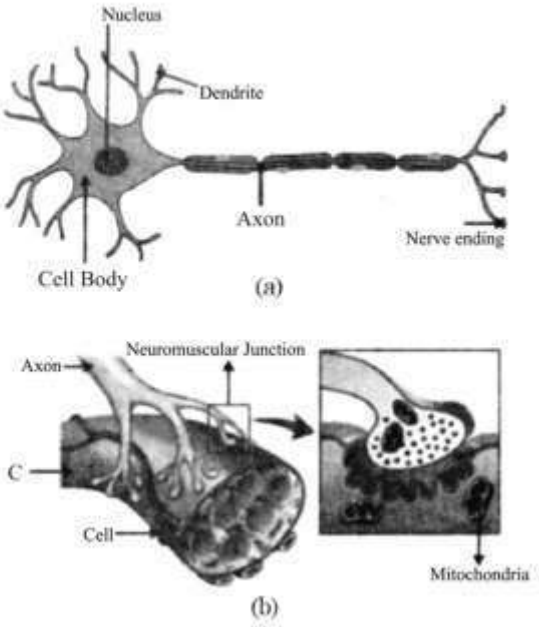
56. What is the name of B in the figure?





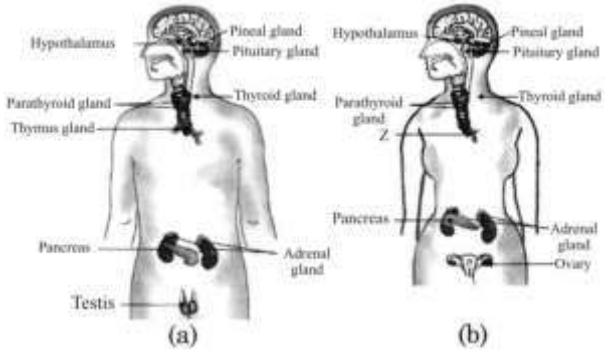
(a) Axon
(b) Lysosome
(c) Ribosome
(d) Cell

57. What is the name of C in the figure?



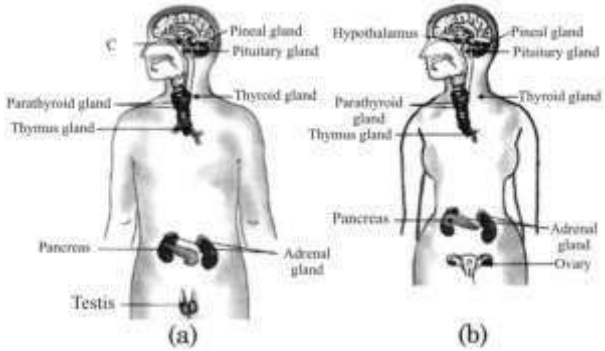
(a) Cellular fiber (b) Muscle fiber
(c) Stomach fiber (d) None of these

58. What does Z depicts in the figure?



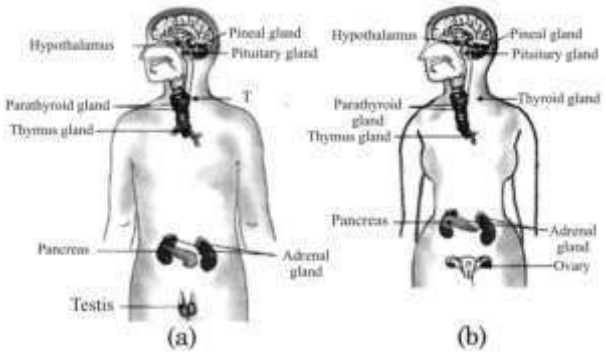
(a) Pancreas
(b) Parathyroid gland
(c) Thymus gland
(d) Pituitary gland

59. What does C depicts in the figure?



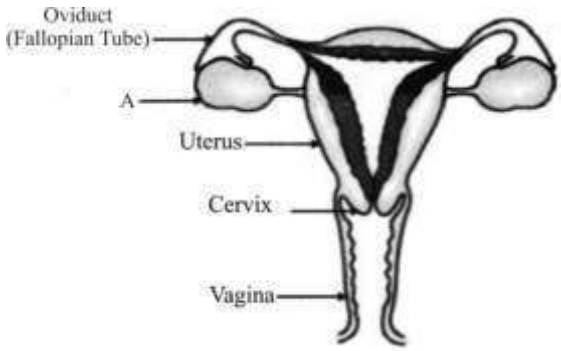
(a) Cerebrum
(b) Forebrain
(c) Hypothalamus
(d) None of these

60. What does T depicts in the figure?



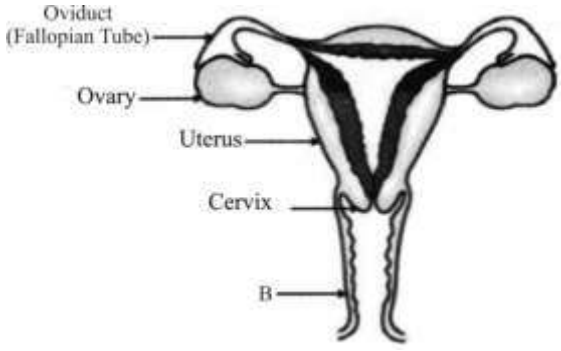
(a) Pancreas
(b) Stomach
(c) Thyroid gland
(d) Neck

61. What does A depict in the figure?



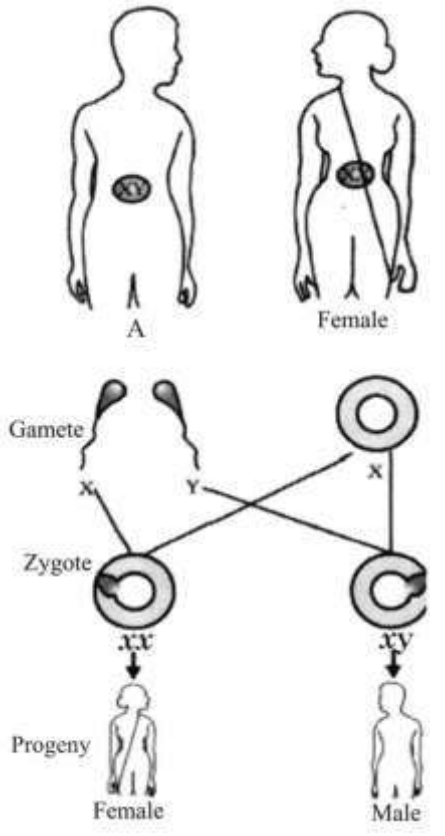
(a) Cervix
(b) Stomach
(c) Liver
(d) Ovary

62. What does B depict in the figure?



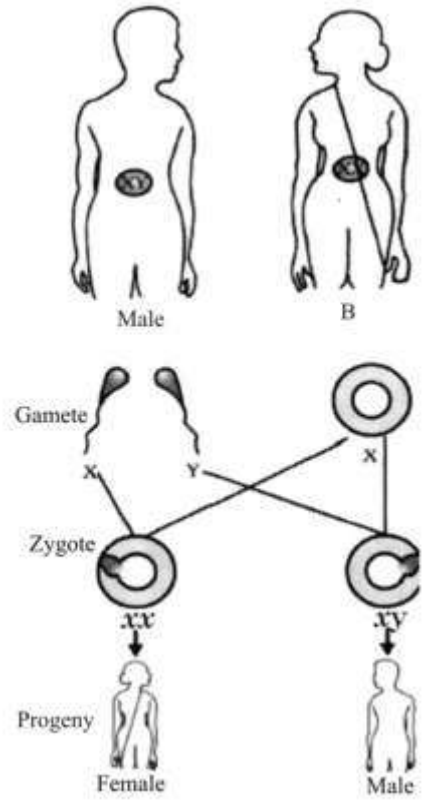
(a) Ovary
(b) Vagina
(c) Hymen
(d) Leg

63. What does A depict in the figure?



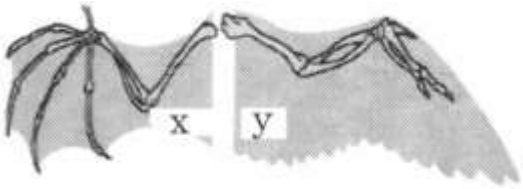
(a) Male (b) Female
(c) Both (d) None of these

64. What does B depicts in the figure?



(a) Male
(b) Female
(c) Both
(d) None of these

65. What is the homologous of x and y in the figure?

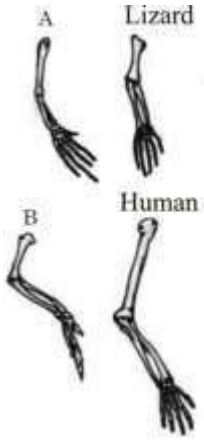


(a) Birds and Animals
(b) Bats and Animals
(c) Bats and Birds
(d) Birds and Humans

66. What does A depict in the figure?

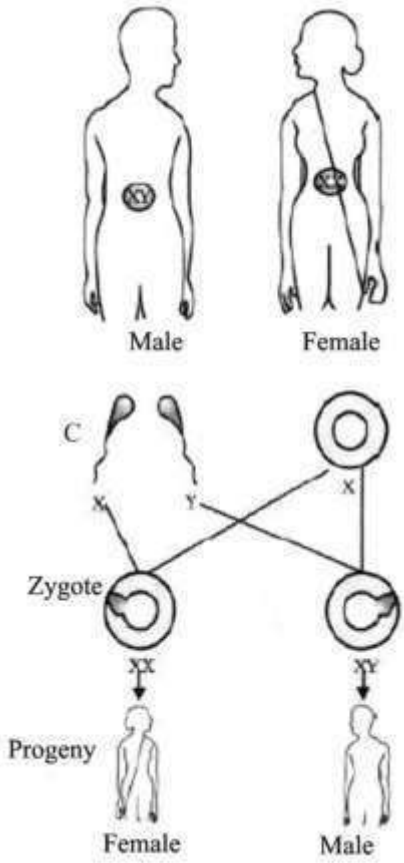
(a) Cross breeding
(b) Ovary
(c) Sperm
(d) Contration

67. Whose homologous organs are A and B in the figure?



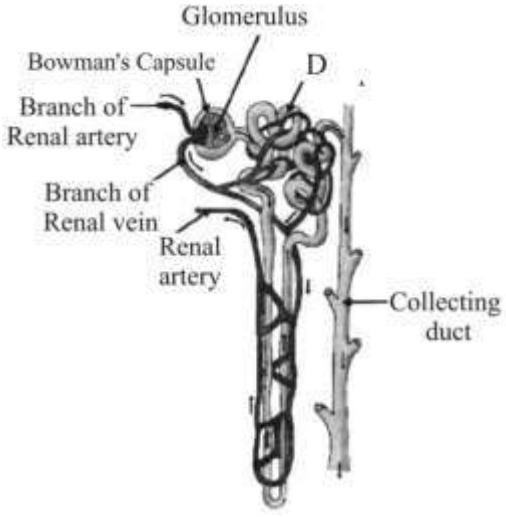
(a) Frog and Human
(b) Human and Bird
(c) Birds and Animals
(d) Frog and Bird

68. What is the name of C in the figure?



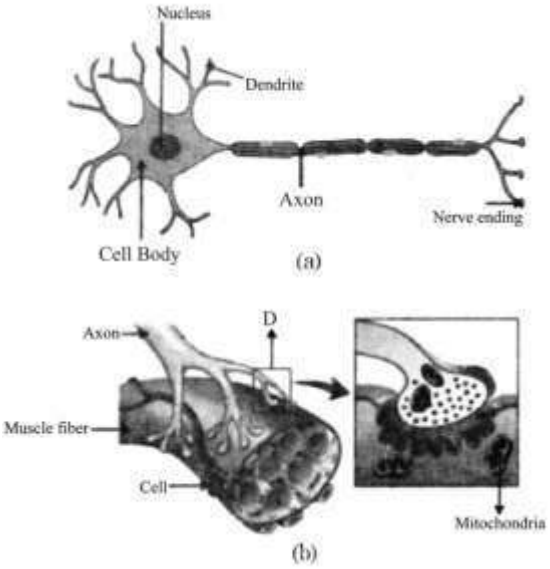
(a) Ovary
(b) Ovum
(c) Sperm
(d) Gamete

69. What is the name of D in the figure?



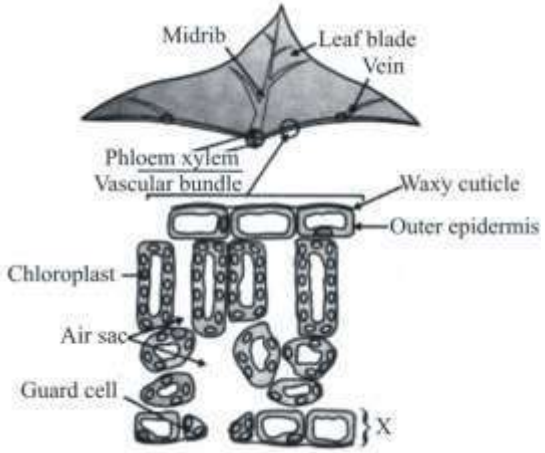
(a) Tubular part of nephron
(b) Tubular part of sperm
(c) Stomach
(d) Liver

70. What is the name of D in the figure?



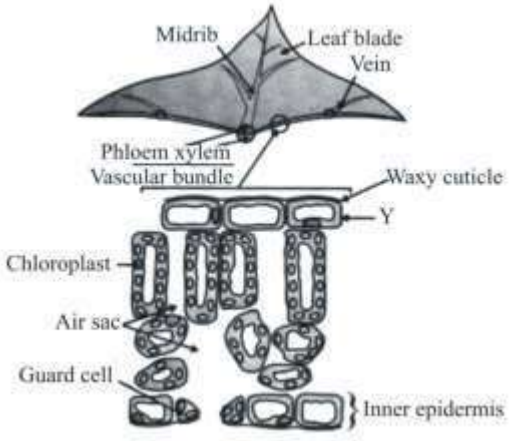
(a) Cytomuscular Junction
(b) Neuromuscular Junction
(c) Stomach muscular Junction
(d) Hepatic muscular junctions

71. What does X depicts in the figure?



(a) Lower outer Layer (b) Upper outer Layer
(c) Inner epidermis (d) Outer epidermis

72. What is the name of Y in the figure?



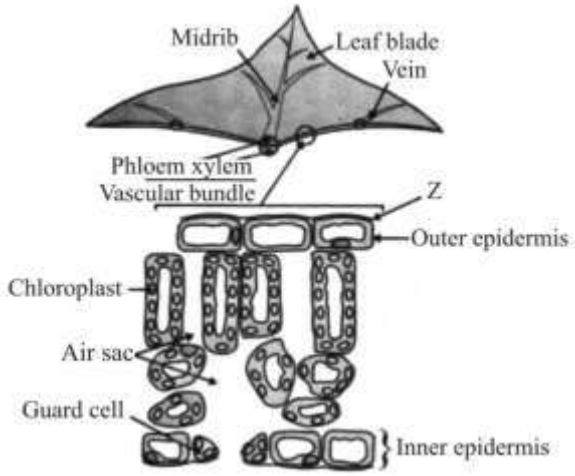
(a) Inner epidermis

(b) Outer epidermis

(c) Cell

(d) Test tube

73. What is the name of Z in the figure?



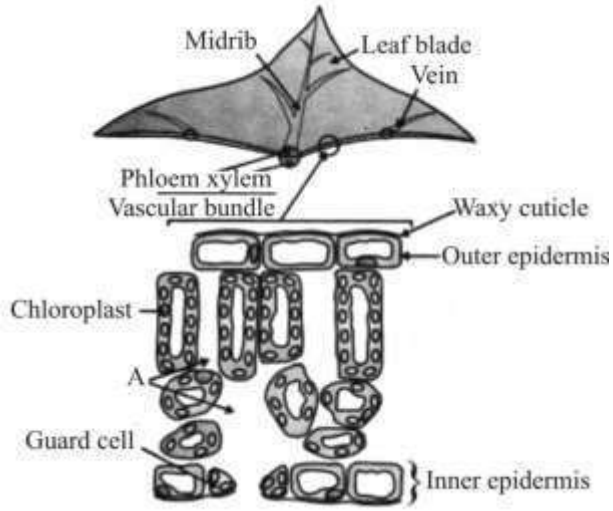
(a) Waxy cuticle

(b) Rosy cuticle

(c) Raj cuticle

(d) Cell cuticle

74. What is the name of A in the figure?



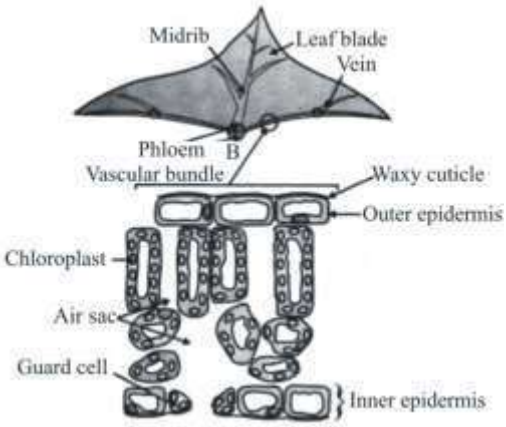
(a) Guard Cell

(b) Stomach cell

(c) Air sac

(d) None of these

75. What is the name of B in the figure?



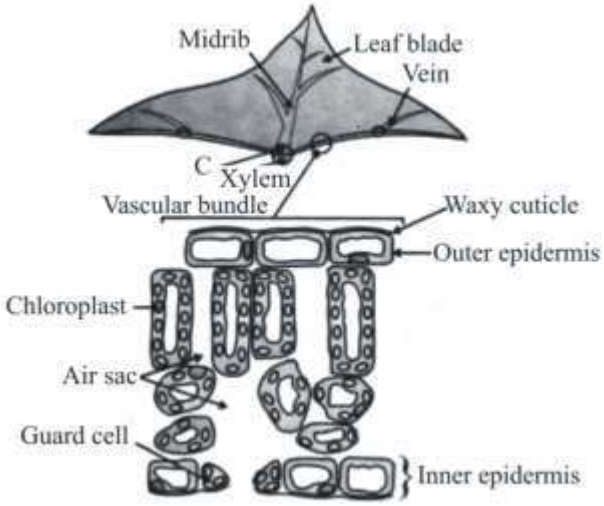
(a) Permanent tissue

(b) Xylem

(c) Phloem

(d) None of these

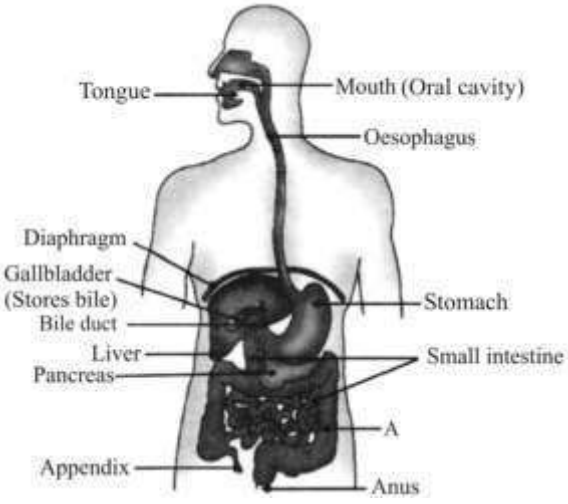
76. What is the name of C in the figure?



(a) Phloem (b) Vascular bundle

(c) Cell (d) Plastid

77. What is the name of A in the figure?



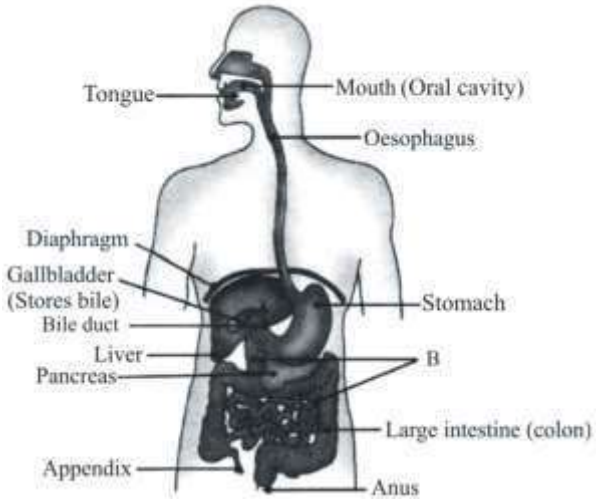
(a) Latitude

(b) Cell

(c) Liver

(d) Large intestine

78. What is the name of B in the figure?



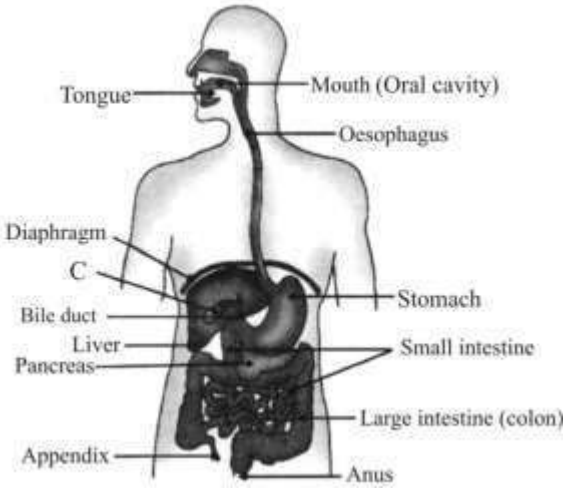
(a) Large intestine

(b) Latitude

(c) Bile duct

(d) Small intestine

79. What is the name of C in the figure?



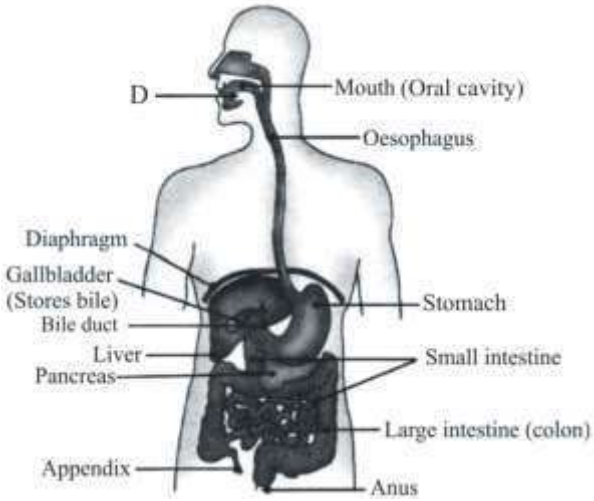
(a) Large intestine

(b) Small intestine

(c) Gall bladder

(d) None of these

80. What does D depicts in the figure?



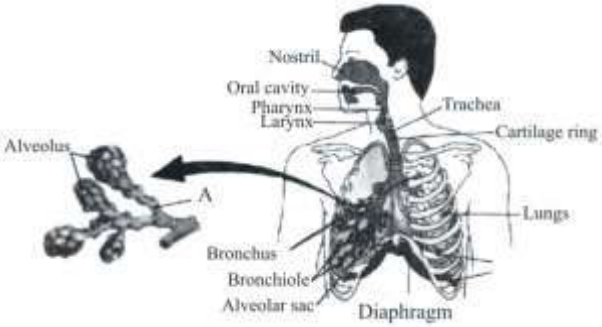
(a) Teeth

(b) Tongue

(c) None

(d) Ear

81. What does A depicts in the figure?



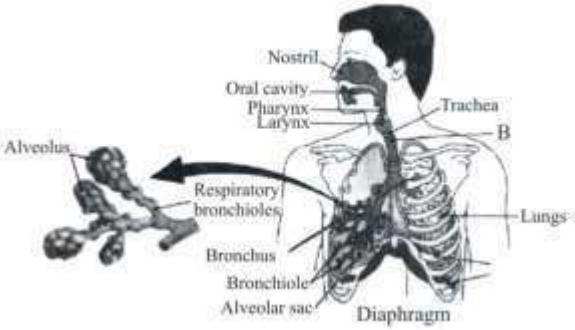
(a) Respiratory bronchioles

(b) Stomach

(c) Liver

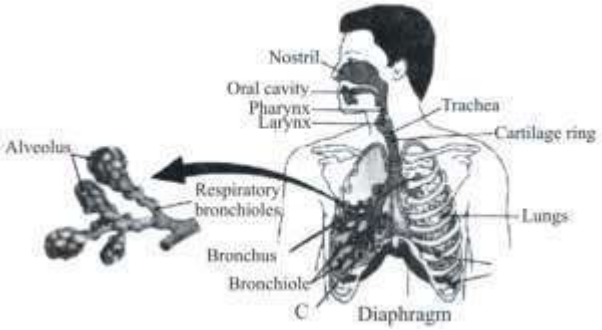
(d) Kidney

82. What does B depicts in the figure?



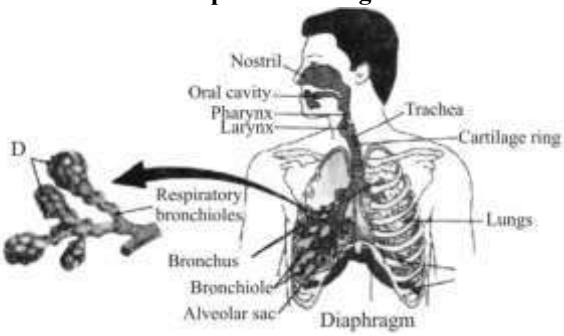
(a) Bone ring (b) Cartilage ring
(c) Cell ring (d) None of these

83. What does C depicts in the figure?



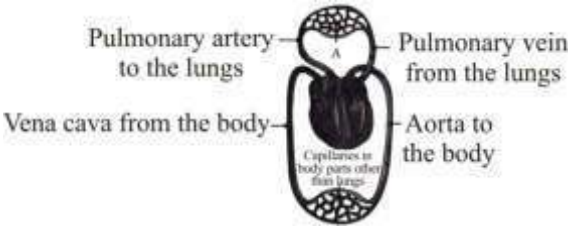
(a) Tube sac (b) Alveolar sac
(c) Cell sac (d) None of these

84. What does D depicts in the figure?



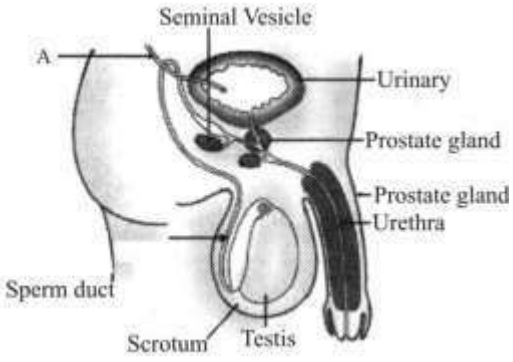
(a) Tube (b) Reticulum
(c) Alveolus (d) Bronchiole

85. What does A depicts in the figure?



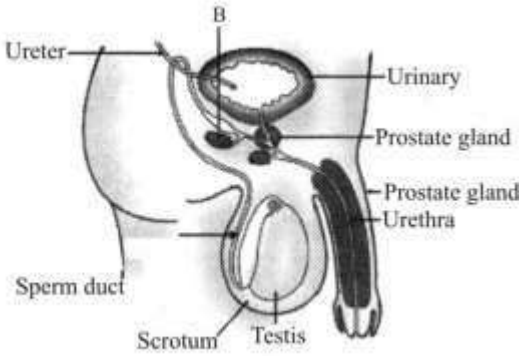
(a) Pulmonary Capillaries
(b) Pulmonary Vein
(c) Pulmonary Artery
(d) None of these

86. What does A depicts in the figure?



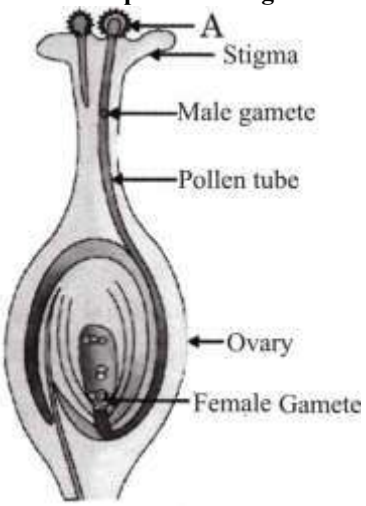
(a) Filament tube
(b) Vein
(c) Artery
(d) Ureter

87. What does B depict in the figure?



(a) Stomach (b) Seminal Vesicle
(c) Urinary bladder (d) cells

88. What does A depict in the figure?



(a) Pollen grain (b) stamen
(c) Pistil (d) Pollen tube

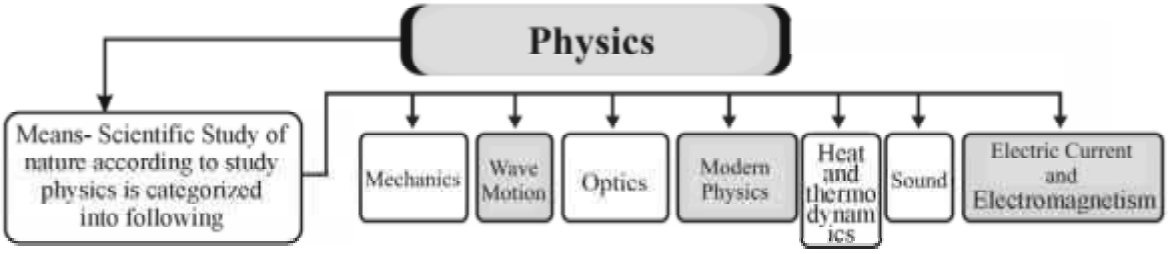
ANSWER KEY

1. (c)	2. (b)	3. (d)	4. (a)	5. (b)	6. (a)
7. (a)	8. (c)	9. (a)	10. (c)	11. (d)	12. (d)
13. (c)	14. (c)	15. (b)	16. (c)	17. (d)	18. (a)
19. (b)	20. (b)	21. (b)	22. (d)	23. (b)	24. (c)
25. (a)	26. (c)	27. (c)	28. (c)	29. (b)	30. (d)
31. (b)	32. (a)	33. (c)	34. (b)	35. (c)	36. (a)
37. (d)	38. (d)	39. (d)	40. (b)	41. (c)	42. (a)
43. (c)	44. (c)	45. (c)	46. (a)	47. (b)	48. (c)
49. (c)	50. (a)	51. (c)	52. (b)	53. (a)	54. (d)
55. (a)	56. (d)	57. (b)	58. (c)	59. (c)	60. (c)
61. (d)	62. (b)	63. (a)	64. (b)	65. (c)	66. (a)
67. (d)	68. (d)	69. (a)	70. (b)	71. (c)	72. (b)
73. (a)	74. (c)	75. (b)	76. (a)	77. (d)	78. (d)
79. (c)	80. (b)	81. (a)	82. (b)	83. (b)	84. (c)
85. (a)	86. (d)	87. (b)	88. (a)		

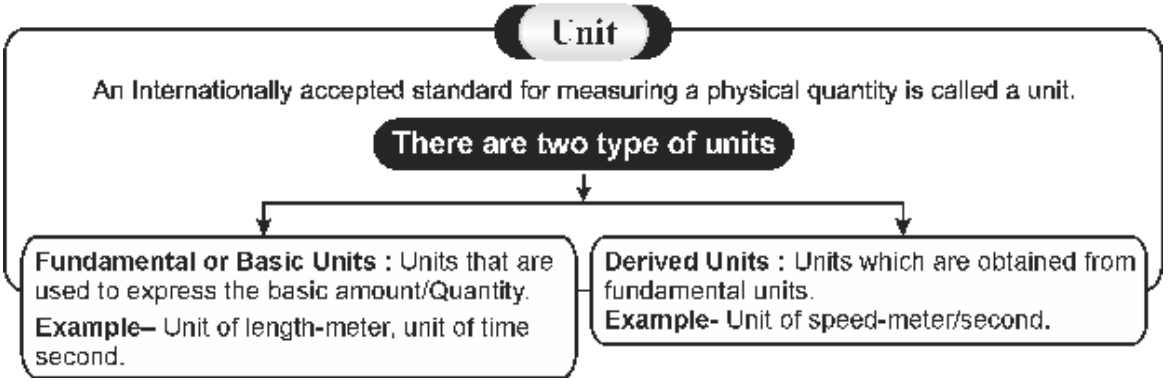
A.

PHYSICS

1. UNIT/ Measurement/Measuring Instrument



(i) Unit



Fundamental Quantities and their units in S.I. system.

S.N.	Physical Quantities	Unit	Symbol
1.	Mass	Kilogram	kg
2.	Length	Meter	m
3.	Time	Second	s
4.	Temperature	Kelvin	K
5.	Light Intensity	Candela	cd
6.	Electric Current	Ampere	A
7.	Amount of substance	Mole	mol

Various units of measurement

Quantities	Units		
Angle	Radian	Momentum	kg-m/s
Solid Angle	Steradian	Impulse	Newton-Second
Buoyant Force, weight	Newton or Kg–m/s^2	Angular Momentum	Kg-m^2/s
Area	Square meter	Pressure	Pascal, N/m^2
Volume	Cubic meter	Power	Watt, Jule/ Second
Speed, Velocity	Meter/second	Surface Tension	Newton/meter
Angular Velocity	Radian/ Second	Viscosity	N-s/m^2
Frequency	Hertz	Heat Conductivity	Watt/m –K
Moment of Inertia	Kilogram-meter square	Magnetic flux	Weber
		Displacement, distance	Meter

Work & Energy	Newton-meter or Joule
Electric conductance	Siemens/meter
Deceleration	Meter/ Second^2
Entropy	Joule/Kelvin
Specific Heat	Joule/kg-K
Electric Charge	Coulomb
Electric Potential	Volt
Resistance	Ohm
Capacitance	Faraday
Inductance	Henry
Luminious Flux	Lumen
Wavelength	Angstrom
Power of Lens	Diopter
Intensity of sound	Watt/m^2
Magnetic field	Tesla

Stress	N/m^2 or Pascal
Young Modulus	N/m^2 or Pascal
Radioactivity	Becquerel
Density	kg/m^3
Relative density	No unit (ratio of same quantity)
Strength of sound	Decibel
Atmospheric Pressure	Bar
Latent Heat	Joule/kg
Astronomic distance	Light year or parsec
Gravity Acceleration	m/s^2
Depth of Sea	Fatham
Ultrasonic Speed	Mack
Gravitational Constant (G)	Newton m^2/kg^2

Different Physical Quantities, their Relation with Fundamental Quantity and Dimension Formula

Physical Quantity	Relation with other quantity	Dimensional Formula
Area	Length × Width	$[L] \times [L] = [L^2] = [M^0L^2T^0]$
Volume	Length × Width × Height	$[L] \times [L] \times [L] = [L^3] = [M^0L^3T^0]$
Density	$\frac{\text{Mass}}{\text{Volume}}$	$\frac{[M]}{[L^3]} = [M\,L^{-3}T^0]$
Velocity or Speed	$\frac{\text{Displacement}}{\text{Time}}$ Or $\frac{\text{Distance}}{\text{Time}}$	$\frac{[L]}{[T]} = [LT^{-1}] = [M^0LT^{-1}]$
Linear Momentum	Mass × Velocity	$[M]\,[LT^{-1}] = [MLT^{-1}]$
Acceleration	$\frac{\text{Change in velocity}}{\text{Time}}$	$\frac{[L/T]}{[T]} = [LT^{-2}] = [M^0LT^{-2}]$
Gravitational Acceleration, Centripetal Acceleration, Deceleration	$\frac{\text{Change in velocity}}{\text{Time}}$	$\frac{[L/T]}{[T]} = [LT^{-2}] = [M^0LT^{-2}]$
Force	Mass × Acceleration	$[M][LT^{-2}] = [MLT^{-2}]$
Impulse	Force × Time	$[MLT^{-2}]\,[T] = [MLT^{-1}]$
Pressure	$\frac{\text{Force}}{\text{Area}}$	$\frac{[MLT^{-2}]}{[L^2]} = [ML^{-1}T^{-2}]$
Work, Energy	Force × Displacement	$[MLT^{-2}]\,[L] = [ML^2T^{-2}]$
Power	$\frac{\text{Work}}{\text{Time}}$	$[ML^2T^{-2}]\,[T^{-1}] = [ML^2T^{-3}]$
Surface Tension	$\frac{\text{Force}}{\text{Length}}$	$\frac{[MLT^{-2}]}{[L]} = [ML^0T^{-2}]$
Moment of Inertia	Mass × (Distance)^2	$[M]\,[L^2] = [ML^2T^0]$
Frequency	$\frac{\text{Oscillation}}{\text{Time}}$	$\left[\frac{1}{T}\right] = [M^0L^0T^{-1}]$
Planck's constant	$\frac{\text{Energy}}{\text{Frequency}}$	$\frac{[ML^2T^{-2}]}{[T^{-1}]} = [ML^2T^{-1}]$
Torque	Force × Perpendicular distance	$[MLT^{-2}]\,[L] = [ML^2T^{-2}]$
Stress	$\frac{\text{Force}}{\text{Area}}$	$\frac{[MLT^{-2}]}{[L^2]} = [ML^{-1}T^{-2}]$
Strain	$\frac{\text{Change in length}}{\text{Initial Length}}$	$\frac{[L]}{[L]} = 1 = [M^0L^0T^0]$ = Unit less quantity

■ The commercial unit of Electric Power is	**Kilo-watt-hour (KWH)**	**RRB Group-D 30/09/2022 (Shift-I) UPSSSC Lower Mains 21/10/2021 Paper-II UP UDA/LDA (Pre-2006) RRB JE 02/06/2019 (Shift-I)**
■ Quantity that is measured in 'Siemens'-	**Electric conductance**	**(SSC 10+2 CHSL 08.01.17, 4.15 pm)**
■ S.I. unit of volume is−	**Meter Cube**	**Lower-II (Re-exam) (28-07-2019) UP UDA/LDA (Pre-2010)**
■ S.I. unit of time is−	**Second**	**SSC JE Civil – 23/03/2021 (Shift-II)**
■ S.I. unit of magnetic induction−	**Tesla**	**UPSI Batch-1, 19 Dec 2017**
■ The name of unit for measuring frequency is−	**Hertz**	**UP UDA/LDA (29/11/2015) SSC MTS 27/10/2021 (Shift-I) SSC CHSL-02/07/2019 (Shift-III) UP SSSC Cane Supervisor Exam 03/07/2016 (Paper-I)**
■ In S.I. system, the unit of force is−	**Newton**	**Rajasva Nirikshak – 17-07-2016 (Paper-I) RRB NTPC 08/02/2021 (Shift-II) Stage-1st RRB NTPC (Stage-1st) 16/04/2016 (Shift-II) UPPSC AE-2008**
■ The unit of atmospheric pressure is−	**Bar**	**Rajasva Nirikshak – 17-07-2016 (Paper-I)**
■ S.I. unit of dynamic Viscosity is−	**Pascal-Second**	**Krishi Pravidhik – 15-02-2019 UP PCS (Pre) GS-2009**
■ The unit of power is−	**Joule/Second**	**Combined Medical Services Competative- 24-01-2016**
■ The unit of pressure is−	**Pascal**	**SSC CHSL 04.08.2021 (Shift-I)**
■ The definition of CGS system of measurement units is−	**Centimeter, Gram, Second**	**Lower Exam – 01-10-2019 (Shift-II) UP PCS (Pre) GS-2008**
■ The SI unit of temperature is-	**Kelvin**	**SSC CHSL 18/03/2020 (Shift-III) Lower-I 01/10/1998**
■ The physical quantity dimension $[ML^2T^{-2}]$ is−	**Work done**	**Rajasva Nirikshak 17-07-2016 (Paper-I)**
■ The dimension of physical quantity of power is−	**$[M^1L^2T^{-3}]$**	**(UPP Constable 27.01.2019 Shift-I)**
■ The represent units of the same physical quantity−	**Joule & Calorie**	**UPPSC AE 2021**
■ The S.I. unit of resistance is equivalent to–	**volt/ampere**	**RRB Group-D 25-08-2022 (Shift-III)**
■ The S.I. unit of induced potential difference is–	**Volt (V)**	**RRB Group-D 22-08-2022 (Shift-III)**
■ The SI unit of sound wave frequency was named in honour of–	**Heinrich Rudolf Hertz**	**RRB NTPC 19.01.2021 (Shift-II) Stage Ist**
■ The work done by a force acting on an object is equal to the amount of force multiplied by the distance travelled in the direction of the force. _____is NOT a unit of work.	**Kgm/sec^2**	**RRB NTPC 13.03.2021 (Shift-I) Stage Ist UP PCS (Pre) GS-1995**
■ The unit of Force is–	**$Kgms^{-2}$**	**RRB NTPC 13.03.2021 (Shift-I) Stage Ist UP PCS (Pre) GS-1997**

■ 'Mho' is the unit of ____ of a substance-	**Conductance**	**(SSC 10+2 CHSL 23.01.17, 1.15 pm)**
■ The SI unit of electrical resistivity is …….	**-Ohm-meter**	**RRB Group-D 04-12-2018 (Shift-III) UP PCS (Pre) GS-2005**
■ The amount of radiation being emitted by a radioactive material is measured using the conventional unit ———.	**-Curie**	**RRB Group-D 05/10/2018 (Shift-II) UPSI 21/11/2021 (Shift-III) RRB NTPC 29.01.2021 (Shift-II) Stage Ist**
■ The quantity is measured in 'joules' is–	**-Energy**	**RRB NTPC 28.01.2021 (Shift-I) Stage Ist**
■ Henry per meter is the unit of_____.	**-Magnetic permeability**	**UP PCS (Pre) GS-2002 ALP Stage -II 23.01.2019 (Shift - II)**
■ A light-year is a unit of _____	**-Distance**	**RRB NTPC 01.02.2021 (Shift-I) Stage Ist**
■ The SI unit of power of a lens is called–	**-Dioptre**	**RRB NTPC 13.01.2021 (Shift-II) Stage Ist**
■ The SI unit of 'Magnetic Flux' is–	**Weber**	**RRB NTPC 03.03.2021 (Shift-II) Stage Ist**
■ The SI unit of Candela–	**Luminous intensity**	**RRB JE CBT-II 29–08–2019 (evening)**
■ Unit of power is known as–	**Watt**	**RRB JE (24-05-2019, Shift - I) RRB Group-D, 22-10-2018 (Shift –I) RRB ALP & Tec. (21-08-2018, Shift-I)**
■ Units is used to measure the intensity of sound–	**Decibel**	**RRB NTPC 25.01.2021 (Shift-I) Stage Ist UP PCS (Pre) GS-2011 SSC CGL (Tier-I) 12/06/2019 (Shift-II) UPSSSC Cane Supervisor Exam 31/08/2019 (Paper-I) Lower-II - 06/03/2016**
■ The SI Unit of amount of substances is-	**-Mole**	**RRB NTPC 28.12.2020 (Shift-I) Stage Ist RPF Constable 05.02.2019**
■ The unit of the physical quantity, Magnetic flux density is-	**Tesla**	**(SSC 10+2 CHSL 25.01.17, 10 am)**
■ The unit of the physical quantity "Young's modulus" is-	**Pascal**	**(SSC 10+2 CHSL 08.02.17, 4.15 pm)**
■ Unit of momentum is –	**-$kgms^{-1}$**	**RRB ALP & Tec.(14-08-2018, Shift-II) RRB Group-D, 19-09-2018 (Shift –III)**
■ Unit of power in industry is–	**-Horsepower**	**RRB ALP & Tec.(13-08-2018, Shift-III)**
■ S.I. unit of resistance is–	**-Ohm**	**RRB Group-D, 23-11-2018 (Shift –I) RRB ALP & Tec. (09-08-2018, Shift-I) RRB NTPC 21.01.2021 (Shift-II) Stage Ist RRB JE 28-06-2019, (Shift -IV) RRB Group-D, 29-09-2022 (Shift –III) UPSSSC PET 24/08/2021 (Shift-II)**

■ S.I. unit of stress is–	**-N/m^2**	**Lower Exam 30/09/2019 RRB SSE (21-12-2014,Set-8, Green Paper) UP PCS (Pre) Re-Exam GS 2015**
■ The S.I. unit of electric charge is–	**-Coulomb**	**RRB Group-D, 26-11-2018 (Shift –III) RRB ALP & Tec.(10-08-2018, Shift-III) RRB NTPC Stage-Ist,28-03-2016, Shift –II SSC JE Civil 25/09/2019 (Shift-I) UP SI 21/11/2021 (Shift-II)**
■ The formula of Pressure in Physics is-	**Force/Area**	**SSC MTS 08/08/2019 (Shift-II) Lower-II 15/07/2018**
■ 'Torr' is a unit of ———.	**pressure**	**SSC CPO-SI 23/11/2020 (Shift-I) SSC CGL(Tier-I)-07/03/2020 (Shift-III)**
■ S.I. unit of electric current is–	**-Ampere**	**UPSI/ASI 2018 Vyapam Prashikshak 16/09/2018 (Shift-I) RRB Group-D, 24-10-2018 (Shift –II) RRB ALP & Tec.(30-08-2018, Shift-II) UP Lower (Pre) 1998**
■ Unit is equal to unit of energy–	**-Work**	**RRB ALP & Tec.(21-08-2018, Shift-II) UPPSC AE-2011**
■ Ampere second is the unit of–	**-Charge**	**RRB JE (14-12-2014, Red Paper) UPPSC AE-2007 (Paper-II)**
■ Gallon is generally used for–	**-For measuring the volume**	**RRB NTPC Stage-Ist,31-03-2016, Shift –II**
■ Unit is used for measuring Astronomical distance–	**-Light year**	**RRB NTPC Stage-Ist,04-04-2016, Shift –II SSC JE-2023 UP SSSC PET Exam-2022**
■ S.I. unit of pressure is–	**-$Newton/m^2$**	**RRB Group-D, 04-10-2018 (Shift –I) RRB JE, 25-05-2014, (Shift -III) RRB NTPC 15.03.2021 (Shift-II) Stage Ist**
■ The unit of approximate distance from the earth to the sun is–	**-Astronomical Unit**	**RRB NTPC Stage-Ist,16-04-2016, Shift –I**
■ S.I. unit of displacement is–	**-Meter**	**RRB Group-D, 02-11-2018 (Shift –II) SSC 10+2 CHSL-2020**
■ The S.I. unit of 'g' is same as–	**-Acceleration**	**RRB Group-D, 13-12-2018 (Shift –II)**
■ The unit of the physical quantity, Momentum is-	**Newton-second**	**(SSC 10+2 CHSL 30.01.17, 4.15 pm)**
■ Weight has equal S.I. unit of-	**-Force**	**RRB Group-D, 12-11-2018 (Shift –II)**
■ Two physical quantities have the same unit-	**-Force and Weight**	**RRB Group-D, 09-10-2018 (Shift –II)**
■ Newton is S.I. unit of_____.	**-Weight and Force**	**RRB Group-D, 01-10-2018 (Shift –I)**

■ Quantity does not have the same S.I. units- **-Force and pressure**	**RRB JE 24/05/2019 (Shift-I) RRB Group-D 03/10/2018 (Shift-II) RRB Group-D, 01-10-2018 (Shift –III) UP SSSC PET Exam-2021 RRB Group-D, 05-10-2018 (Shift –II)**
■ The international unit of Speed is- **-m/s**	**RRB Group-D, 01-10-2018 (Shift –III)**
■ ms^{-2} is the S.I. unit of physical quantity– **-Acceleration**	**RRB Group-D, 15-10-2018 (Shift –III) UP PSC Food and Sanitary Inspector Exam-2013 RRB JE CBT-II 31.08.2019 IInd Shift**
■ S.I. unit of retardation- **-ms^{-2}**	**RRB Group-D, 03-10-2018 (Shift –III)**
■ S.I. unit of wavelength- **-Meter**	**RRB JE (26-06-2019,Shift-IV) UP SI 21/11/2021 Shift-I UPPCS (Pre) GS-1994 UPSSSC ASO 22/05/2022**
■ A symbol of mole in S.I. unit is- **-mol**	**RRB JE (28-06-2019,Shift-IV)**
■ Another name for coulomb/second- **-Ampere**	**RRB JE (28-05-2019,Shift-III)**
■ Lux is the SI unit of **-Intensity of illumination**	**RRB JE (14-12-2019,Green Paper)**
■ S.I. unit of wave speed- **-Meter/second (m/s)**	**SSC CHSL 29/01/2017 10:00 AM Lower-I 28/02/2016 RRB JE (28-05-2019, Shift-III)**
■ Physical quantities has the same SI unit as Work- **Energy**	**SSC MTS/Havaldar– 07/07/2022 (Shift-III) SSC JE Electrical 09/10/2023 (Shift-III) RRB Group D 12/12/2018 (Shift-III)**
■ The unit of magnetic intensity in CGS (Centimeter-Gram-Second) system is– **Oersted (Oe)**	**UP SI 17/11/2021 Shift-II SSC CHSL (Tier-II) – 26/06/2023**
■ _____is a non-S.I. unit called 'nit' is photometric quantity which is used to measure the multiplicity of light intensity- **Luminance**	**SSC CGL (Tier-1)– 18/07/2023 (Shift-III)**
■ Electron-volt is a unit of _____. **Energy**	**SSC CGL–(Tier-I) 13/08/2021 (Shift I)**
■ Parsec is a unit of _____. **Length**	**SSC CGL (Tier-I) 18/08/2021 (Shift II)**
■ The SI unit for measuring the amount of a substance is- **Mole (mol)**	**UPP Constable 28/01/2019 (Shift-II) SSC CGL–(Tier-I) 18/08/2021 (Shift II) SSC JE electrical 24/03/2011 Shift-II**
■ The unit of the Physical quantity Entropy is- **Joule per Kelvin**	**UP SSSC Amin Exam-14/08/2016 (Paper-I) (SSC CPO (Tier-I) 2016)**
■ 'Angstrom' is a unit of measurement of- **Length**	**SSC JE Civil - 23/09/2019 (Shift-I)**

■ Noise is measured in_____.	**Decibel**	**SSC JE Civil - 23/01/2018 (Shift-I) SSC CGL (TIER-1) 01-09-2016, 10 am**
■ The SI unit of intensity of sound is……	**watt/m^2**	**(SSC 10+2 CHSL 17.01.17, 10 am)**
■ 1 Pascal is equivalent to-	**1 Newton per meter square**	**SSC JE Mechanical - 27/09/2019 (Shift-I) RRB Group-D 11/12/2018 (Shift-II)**
■ The unit of the physical quantity "JERK" is-	**m/s^3**	**(SSC 10+2 CHSL 03.02.17, 4.15 pm) UPP Computer Operator Exam 19/05/2016 (Shift-I) SSC JE Civil 30.10.2020 (Shift-I) SSC GD 03/03/2019 (Shift-I)**
■ The unit of the physical quantity "Magnetic field intensity" is-	**Newton per ampere meter**	**(SSC 10+2 CHSL 07.02.17, 10 am) SSC CGL (Tier-I) – 13/06/2019 (Shift-I)**
■ The unit of the physical quantity "Inductance" is-	**Henry**	**(SSC 10+2 CHSL 02.02.17, 10 am**
■ The unit of relative density is-	**It has no unit**	**(SSC 10+2 CHSL 15.01.17, 4.15 pm)**
■ The SI unit of mass is-	**Kilogram**	**SSC JE Electrical – 24/03/2021 (Shift-I)**
■ The SI Unit of time is-	**Second**	**SSC JE Civil – 23/03/2021 (Shift-II) Lower-I 01/10/2019 (Shift-I)**

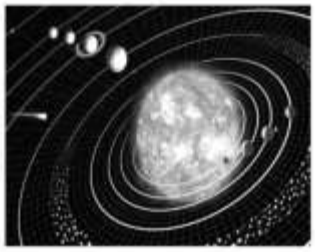
(ii) Measurement

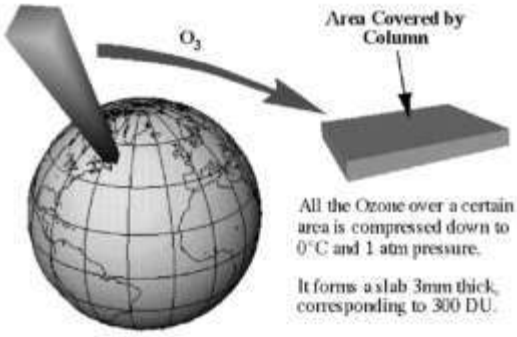
Light Year

- It is the distance traveled by light in 1 year.
- The unit of measurement of astronomical distance is Light year and 1 Light Year = 9.46×10^{15} m

Parsec

- Used to express astronomical distances.
- 1 parsec = 3×10^{16} m or 3.262 light year





Barrel

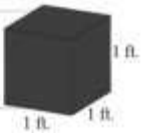
- It is cylindrical container– Used to store liquids.
- One barrel of oil is equal to– 159 liters.

Dobson

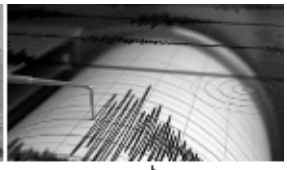
- A unit of measuring the amount of any gas (ozone) present in the vertical column of the atmospheres
- Atmospheric ozone is measured.

Cusec

The unit of measurement of the rate of flow and it is the abbreviations of cubic feet per second.
Expressed– The water flow of rivers is measured.



Knot	It is the speed of one nautical mile per hour. **Unit of measurement**– Speed of ship
Richter Scale	Used to measured the intensity of seismic waves.



Other Measurements of Mass

- 1 Ounce = 28.35 grams
- 1 Pound = 16 ounce 453.592 gram
- 1 kg = 1000 gram/ 2.205 Pound
- 1 quintal = 100 kg
- 1 metric ton = 1000 kg

Other Measurements of Distance

- 1 mile = 1609.344 meter
- 1 nautical mile = 1852 meter
- 1 astronomical unit = 1.496×10^{11} meter

Other Measurement of Time

- 1 Lunar Month = 4 week or 28 days approximately
- 1 Solar Month = 30 days or 31 days, 28 to 29 days in February
- 1 Leap year = 366 day in the year

Different Power of Ten

Power of Ten	Prefix
10^{-1}	Deci
10^{-2}	Centi
10^{-3}	Milli
10^{-6}	Micro
10^{-9}	Nano
10^{-12}	Pico
10^{-15}	Fento/Fermi
10^{-18}	Atoo
10^{18}	Exa
10^{15}	Peta
10^{12}	Tera
10^{9}	Giga
10^{6}	Mega
10^{3}	Kilo
10^{2}	Hecto
10^{1}	Deca

Units of Length–

- 1 inch = 2.54 cm = 25.4 mm
- 1 yard = 3 feet
- 1 feet = 0.3048 meter
- 1 mile = 1.60934 km
- 1 Nautical mile = 1.852 km = 1852 meter

- 1 meter = 10^{6} micrometer
- 1 meter = 10^{3} millimeter
- 1 meter = 3.2 Feet
- 1 meter = 10^{-3} Kilo meter
- 1 meter = 10^{9} Nano-meter
- 1 meter = 10^{12} Pico-meter
- 1 meter = 10^{15} Femto-meter

Change of units from one unit to another-

1 fathom	–	1.8 meter
1 yard	–	0.91 meter
1 chain	–	20.11 meter
1 Angstrom	–	10^{-10} meter
1 square inch	–	6.45 cm^2
1 square - yard	–	0.83 m^2
1 square mile	–	2.59 km^2
1 Cubic inch	–	16.38 cm^3
1 cubic yard	–	0.76 m^3
1 cubic - foot	–	0.028 m^3
1 pint	–	0.56 litre
1 pound	–	0.45 kg
1 Horse power	–	746 watt
1 fathom	–	6 feet
1 yard	–	3 feet
50^0 C	–	122^0F
32^0F	–	0^0 C
-40^0 C	–	-40^0 F
1 foot	–	12 inch
1 mile	–	8 furlongs
1 Nautical mile	–	6076 feet
1 erg	–	10^{-7} Joule

1 dyne	−	10^{-5} Newton
1 Ounce	−	28.35 grams
1 Grain	−	64.8 mg
1 Liter	−	1000 cm^3

Units of Pressure
1. 1 Atmospheric pressure = 1.01325×10^5 Pascal
2. 1 Bar = 1×10^5 Pascal
3. 1 Torr = 133.32 Pascal

■ One Horse power is equal to ..... watt−	**746 Watt**	**UPSSSC PET 16.10.2022 Shift-I**
■ Relation between Atm. and bar is equal to−	**1 atm = 1.013 bar**	**SSC CHSL (Tier-1) – 04/08/2023 (Shift-III)**
■ 1 pound =.....ounce−	**16**	**SSC MTS 08/08/2019 (Shift-III)**
■ 1 watt-Hour is equal to_____−	**3600 Jule**	**Combined Medical Services Competative - 24-01-2016**
■ One volt is equal to−	**1 Joule per coulomb**	**Lower-I - 28-02-2016**
■ Atmospheric pressure is equal to−	**1.01×10^5 Pa**	**RRB Group-D 2018**
■ One 'barrel' of oil is approximately−	**159 liter**	**UPPCS (Pre) G.S. 2009**
■ Megawatt is a unit of measurement of electricity in−	**Power generation**	**UP Lower (Pre) 1998**
■ The value of one kilowatt hour is−	**3.6×10^6 J**	**UPPCS (Pre) G.S. 2009**
■ The speed of airplanes and ships is displaced in knot. The speed of 100 knots will be−	**Equal to 115 mile/hour**	**UPPSC Food & Sanitary Inspector Exam. 2013**
■ A 'light year' is a unit that is use to measure:	**−Distance**	**RRB NTPC 14.03.2021 (Shift-II) Stage Ist**
■ 1 Diopter is equal to–	**$-1\ m^{-1}$**	**RRB JE (02-06-2019,Shift-III) UP UDA/LDA (Pre-2010)**
■ 1 meter is equal to–	**-10^6 micron**	**RRB JE (14-12-2019,Yellow Paper)**
■ Loudness of sound is measured in?	**-Decibel**	**SSC JE-2013 RRB Group-D, 12-11-2018 (Shift –II) UP UDA/LDA (29/11/2015) RRB JE 22-05-2019, (Shift-IV) UP UDA/LDA (Pre-2006)**
■ One nanometre is equal to…….meters.	**10^{-9} m**	**(SSC 10+2 CHSL 15.01.17, 4:15 pm)**
■ 'Femto' means ten raised to the power of_____.	**–15**	**SSC CPO-SI 23/11/2020 (Shift-I)**
■ 1 KW= ?	**$-1000Js^{-1}$**	**RRB Group-D, 12-11-2018 (Shift –I) UP PCS (Pre) GS-2009**
■ Atomic radius is measured in-	**-Nanometer**	**RRB-JE 30.08.2019, (Shift-I) UP PCS (Pre) GS-2016**
■ 1 Pico meter is equal to–	**-10^{-12}m**	**RRB Group-D, 20-09-2018 (Shift –III)**
■ 1 Joule is equal to–	**-1N×1m**	**RRB Group-D, 15-10-2018 (Shift –II)**
■ The strength of winds is measured with the help of	**-Beaufort scale**	**RRB JE CBT-II 28–08–2019 (evening)**
■ Korotkoff sounds are observed during measuring the-	**−Blood pressure**	**R.R.B. JE. Stage - II 01-09-2019 (Shift - III)**
■ The relation between 'atm' and 'bar' is–	**1 atm = 1.013 bar**	**SSC CHSL (Tier-1) – 04/08/2023 (Shift-III)**
■ Mohs scale used–	**To measure hardness of minerals**	**(SSC 10+2 CHSL 23.01.17, 4.15 pm) UP PCS (Pre) GS-2012**

Numerical Question

1. 1 atmosphere = ?

(a) 1.01×10^5Pa
(b) 10.1×10^5Pa
(c) 1.01×10^6Pa
(d) 10.1×10^6Pa

RRB Group-D, 28-11-2018 (Shift –I)
RRB Group-D, 24-11-2018 (Shift –III)

Ans : (a) 1 Atmosphere = 101325 Pa
$= 1.01325 \times 10^5$ Pa
$\because$ 1 Bar = 1×10^5 Pa
1 Atmosphere = 1.01325 bar
= 1 atmosphere = 101.325 kPa
1 atmosphere = 760 Torr
1 Atmosphere = 760 mm Hg column.

2. 1 kWh = ?

(a) 3.6×10^5J
(b) 3.6×10^{-6J}
(c) 3.6×10^6J
(d) 3.6×10^{-5}J

RRB Group-D, 20-09-2018 (Shift –III)
RRB Group-D, 18-09-2018 (Shift –II)
RRB Group-D, 27-09-2018 (Shift –I)
RRB Group-D, 09-08-2018 (Shift –II)
RRB ALP & Tec.(09-08-2018, Shift-I)

Ans : (c) 1 kWh = 3.6×10^6J

3. 5.5 kWh = ?

(a) 14.4×10^8J
(b) 14.4×10^5J
(c) 14.0×10^6J
(d) 19.80×10^6J

RRB Group-D, 04-12-2018 (Shift –II)

Ans : (d) We know that,
1kWh = 3.6×10^6J
5.5 kWh = $5.5\times3.6\times10^6$J = 19.80×10^6J

4. 5.6 kWh = ?

(a) 20.16×10^8J
(b) 14.4×10^6J
(c) 14.4×10^5J
(d) 19.8×10^6J

RRB Group-D, 22-09-2018 (Shift –II)

Ans : (a) We know that,
1kWh = 3.6×10^6J
5.6 kWh = $5.6\times3.6\times10^6$J = 20.16×10^6J

5. 1 Newton = ?

(a) 1 kg × 1 ms^1
(b) 1 kg × 1 ms^{-2}
(c) 1 kg × 1 ms^{-1}
(d) 1 kg × 1 ms^2

RRB Group-D, 10-12-2018 (Shift –III)
RRB Group-D, 22-10-2018 (Shift –II)
SSC 10+2 CHSL-2017

Ans : (b) A Newton (N) is the international unit of force. One Newton is equal to 1 kilogram meter per second square.

$1\ N = 1\ kg \times \frac{1m}{sec^2} = 1\ kg \times 1\ ms^{-2}$

6. 4.6 kWh = ?

(a) 14.0×10^6J
(b) 16.56×10^6J
(c) 14.1×10^8J
(d) 14.4×10^5J

RRB Group-D, 05-12-2018 (Shift –II)

Ans : (b) 4.6kWh = $4.6\times3.6\times10^6$J = 16.56×10^6J

7. 2 kWh = ?

(a) 7.2×10^8J (b) 7.2×10^6J
(c) 7.2×10^5J (d) 72×10^5J

RRB Group-D, 03-12-2018 (Shift –II)

Ans : (b) We know that,
1kWh = 3.6×10^6J
2 kWh = $2\times3.6\times10^6$J = 7.2×10^6J

8. 4.2 kWh = ?

(a) 14.4×10^5J (b) 15.12×10^6J
(c) 14.0×10^6J (d) 14.4×10^6J

RRB Group-D, 05-12-2018 (Shift –I)

Ans : (b) We know that,
1kWh = 3.6×10^6J
4.2 kWh = $4.2\times3.6\times10^6$J
= 15.12×10^6J

9. 1 Nano meter = ?

(a) $1/10^{-8}$m (b) $1/10^{-9}$m
(c) $1/10^8$m (d) $1/10^9$m

RRB Group-D, 16-11-2018 (Shift –I)

Ans : (d) 1 Nano meter = 1×10^{-9} m = $1/10^9$m

10. 1 coulomb/1sec. = ?

(a) 1 volt (b) 1 ampere
(c) 1 ohm (d) 1 watt

RRB Group-D, 12-10-2018 (Shift –III)

Ans : (b) In terms of SI unit, 1 Coulomb is equivalent to one Ampere/second.

$1\ ampere = \frac{1\ coulomb}{1\ sec}$

11. A particular household has consumed 100 unit of energy during 5 days. How much energy is this converted to Joule.

(a) 360×10^8J (b) 360×10^{-8}J
(c) 3.6×10^{-8}J (d) 3.6×10^8J

RRB Group-D, 03-10-2018 (Shift –III)

Ans : (d) 1 unit = 1 kWh
1 kWh = 3.6×10^6J
Therefore, 100 units = $100\times3.6\times10^6 = 3.6\times10^8$J

(iii) Measuring Instrument

Sonar
Sound Navigation and Ranging

Using the ultrasonic waves to detect something under the sea. Helpful in finding the location of the object.

Use- In navigation of submarines.

Radar
Radio Detection and Ranging

To find the location of an object.

Use- For operation of aircraft at airport by use of microwaves.

Instrument	Uses
Eudiometer	To measure change in mixture of gases
Cryometer	To measure low temperatures
Diagometer	For electrical conductivity measurements
Cymometer	To measure the frequency of oscillation of electric waves
Ergometer	To measure work done
Hyetometer	This is a type of rain measuring instrument
Cyanometer	To measure the intensity of the blue colour of the sky or sea
Durometer	To measure the hardness of plastic and rubber
Lucimeter	To measure light intensity
Bolometer	Measuring thermal and Electomagnetic radiation by measuring changes in temperature
Polygraph	Lie dectector
Spectroheliograph	Equipment used to photograph the sun
Megaphone	To transfer sound
Beaufort Scale	To measure wind speed
Helioscope	Used in observing the sun and sunspots
Voltmeter	To measure potential difference
Tachometer	To determine rotational speed
Stalagmometer	To measure surface tension
Venturimeter	The rate of flow of fluid at any point in a pipe is measured
Rotameter	It is used to measue the rate of flow of liquid in a closed tube
Pitot Tube	Used to measure the rate of fluid flow
Hydrometer	It is used to measure the relative density of liquid
Sonar	Detection of objects under water (Based on echolocation principle)
Scuba	Used by divers to breath underwater
Lactometer	To measure the purity or density of milk
Thermometer	For measuring temperature
Accelerometer	To measure acceleration
Ohm meter	To measure resistance in an electrical circuit
Microscope	To magnify tiny objects to see them in larger form
Microtome	To section paraffin & plastic embedded tissues
Sextant	Height measuring device
Oscillograph	Instrument that displays electrical and mechanical vibrations on a graph
Crescograph	Plant growth measuring device
Endoscope	Instrument that looks at the internal parts of the human body
Potometer	Instrument that measure the rate of transpiration in plants
Saccharometer	To measure sugar concentration
Aerometer	This instrument is used to determine the weight and density of air and gas
Accumulator	It is used to store electric energy and energy uses as when need
Barograph	To measure the change in atmospheric pressure
Barometer	This instrument is used to measure air pressure
Altimeter	It is used to measure the altitude of a flying aircraft
Ammeter	It is used to measure the electric current
Calipers	Through this, the inside and outside diameters of cylindrical objects are measured. And in this the thickness of the objects is also measured.

Audiometer	To measure a person's hearing capacity for various sounds.
Anemometer	This instrument is used to measures the strength and speed of the wind.
Audiophone	People use it in their ear to aid hearing.
Chronometer	This equipment is installed on ships. It is a type of a clock or a wrist watch of great accuracy especially for determining longitude at sea.
Calorimeter	This instrument is made of copper and is used to measure the volume and heat produced during a certain time interval.
Cinematograph	It is used as a camera, projector and film printer.
Carburetor	This instrument is used in internal combustion petrol engines. A mixture of petrol and air is made with this machine.
Cardiogram	Through this the heart rate is checked. It is also called electro cardiogram.
Dictaphone	It is used to record one's words and orders to another person. It is often used in offices
Cyclotron	With the help of this device charged particles like electron, proton etc. are accelerated
Compass Box	Through this device, the north-south direction of a place is known
Dynamometer	This instrument is used to measure the power generated by the engine
Geiger Muller Counter	With the help of this equipment the radiation of a radioactive source is calculated
Fathometer	This instrument is used to measure the depth of the sea.
Kaleidoscope	Through this, different types of linear and mathematical shapes appear
Gravimeter	To measuring the gravitational field of earth at specific locations.
Manometer	Its help is taken in determining the pressure of gas.

Galvanometer	This instrument is used to determine the direction and amount of electric current in small electric circuits
Odometer	It is used to measure the distance travelled by a wheeled vehicle
Theodolite	It is an instrument used to measure transverse and perpendicular angles
Thermostat	With its use the temperature of an object is maintained up to a certain point
Telescope	With the help of this device distant objects can be seen clearly
Viscometer	It is an instrument used to determine the viscosity of liquids/fluid
Spherometer	It is used to find the radius of curvature of a spherical plane.
Hydrophone	It is an instrument used to calculate sound waves inside water.
Hygrometer	With its helps the humidity present in the atmosphere is measured.
Screw Gauge	It is used to measure the diameter of fine wires.
Seismograph	It is an earthquake detecting device.
Cytotron	It is a device used to generate artificial weather.
Photometer	It is used to compare the illumination intensity of two sources.
Phonograph	It is a device used to sound writing.
Radiometer	This instrument is used to measure radiation.
Radar	This instrument is used to detect aircraft travelling in space and to determine their position.
Rain Gauge	This is an instrument used to measure rainfall.
Pyrometer	This instrument is used to find the temperature of distant objects.
Refractometer	It is an instrument to determine the refractive index of transparent mediums.
Potentiometer	It is used in comparing electromotive forces, in measuring small resistances and in calibration of voltmeter and ammeter.

Periscope	A device used in submarines, with the help of which a person immersed in water can see the view above water.
Submarine	It is a small underwater ship, with the help of which we can also keep track of the movement on the surface of the sea.
Speedometer	It is a speed displaying device which is installed in vehicles like car, truck etc.
Stroboscope	The speed of objects rotating with periodic motion is determined with the help of this instrument.
Safety Lamp	It is a device used in mines for lighting. With its help, explosion in mines can be prevented.
Gyroscope	With this instrument the speed of rotating objects is dertermind.

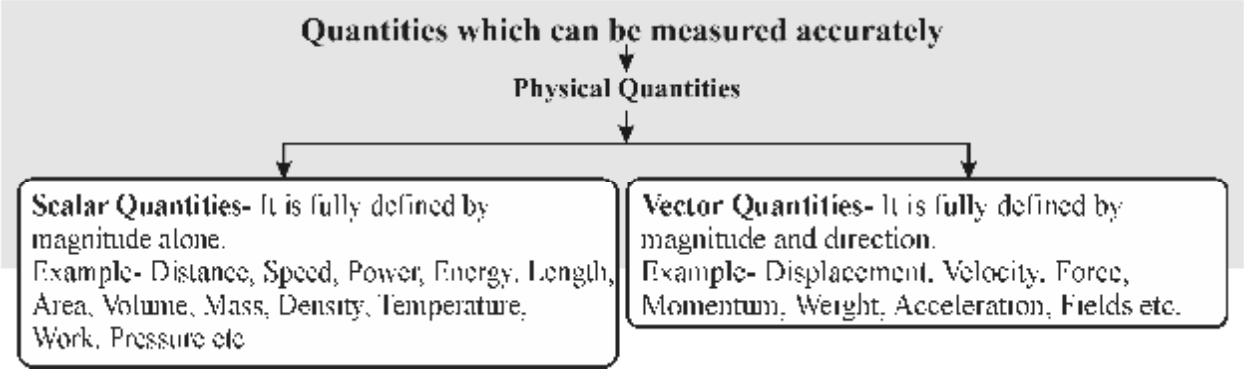
■ Electric current is measured from the instrument− **Ammeter**	**UP SI 21.11.2021 (Shift-III) RRB J.E. 2014 SSC MTS 05.10.2021 (Shift-II) RRB JE 14-12-2014 (Red Paper)**
■ To measure the speed of wind, instruments are used− **Anemometer**	**SSC JE Civil 2019 SSC CHSL 2017 RRB NTPC 23.07.2021 (Shift-I) UPP Constable 19.06.2018 (Shift-II) RRB Group D 12/10/2018 (Shift-I)**
■ The instrument can be used to measured the density of liquid or solid− **Pycnometer**	**(UPP Constable 28.01.2019)**
■ The density of milk is measured by− **Lactometer**	**Cane Supervisor 03-07-2016 (Paper-I) SSC JE Electrical 10.12.2020 (Shift-II) RRB Group D 2018**
■ Radioactivity is measured by− **By Geiger-Muller Counter**	**Lower-I - 28-02-2016**
■ To measure the depth of the ocean instrument is used− **Fathometer**	**Lower-III - 26-06-2016 (SSC 10+2 CHSL 09.01.17, 10 am) UPPSC AE 2007 Paper-I**
■ Terminal Doppler Weather Radar (T.D.W.R.) is used- **Landing airplanes in bad weather**	**Amin Examination 14-08-2016 (Paper-I)**
■ The instrument that is used to measure absorbed or evolved heat− **Calorimeter**	**Lower Exam – 30-09-2019 (Shift-I)**
■ The formula to calculate BMI is− **Weight (kg)/[Length (m)]^2**	**UPP Com. Operator. 19-05-2016 (Shift-I)**
■ Can be used to detect lies during investigation− **narco test, brain mapping test, polygraph test**	**UP PCS (Pre) GS-2004 UP SI (Ranker), 2011 RRB NTPC 03.03.2021**
■ The device that is used to measure distance on the map− **Opisometer**	**UPSI, 1999**
■ Very small time intervals (Less than nano second) are measured by- **Atomic Clock**	**BEO exam-2006 (I)**
■ Pyrometer is called− **radiation thermometer**	**UPPCS (Pre.) G.S. 2016**
■ The instrument can be measured temperatures more than1500ºC− **Pyrometer**	**UP UDA/LDA Spl. (Pre) 2010 SSC MTS 12/10/2021 (Shift-II) UPPCS (Pre) G.S. 2009 Lower (Pre) 2008**

■ Pyrheliometer is used for− **measure solar radiation**	**UPPCS (Pre.) Re-exam 2015**
■ 'Sonar' is mostly used in− **By navigators**	**UPPCS (Pre) G.S. 2004**
■ The intensity of earthquake is measured by− **Through seismograph**	**SSC JE Civil 23.03.2021 (Shift-I) SSC GD 07.12.2021 SSC 10+2 CHSL 2017**
■ Used in wrist watches, display devices and pocket calculators− **Liquid crystal**	**UPPCS (Pre) G.S. 1996**
■ The name of the instrument for measuring blood pressure is− **Sphygmomanometer**	**UPPCS (Pre) G.S. 2007**
■ The principle on which the stethoscope used by doctors works is− **Superposition of sound waves**	**UPPCS (Pre) G.S. Spl. 2004**
■ Auxanometer uses− **Measuring the growth rate of plants**	**UPPCS (Main) G.S. IInd 2010**
■ Mercury is generally used in thermometers because its characterize is− **high coefficient of Expansion**	**UP Lower (Pre) 2002**
■ Height of object is measured by− **An sextant**	**UPPSC Asst. Forest Conservator Exam 2013**
■ The instrument that is used to measured the intensity of light is called− **Luxmeter**	**UPPCS (Main) Spl. G.S. IInd Paper, 2004**
■ In lie detection, the poly graph, while answering question measures ? **brain activity & heart rate**	**UPPSC AE-2008**
■ Instrument aids in the detection of the heartbeat is- **Stethoscope**	**RRB Group-D– 02/09/2022 (Shift-III)**
■ To detect the presence of electric charge on an object- **Electroscope**	**RRB NTPC 19.03.2021 (Shift-I) Stage Ist**
■ A lie detector apparatus is also known as a : **Polygraph**	**RRB NTPC 03.03.2021 (Shift-I) Stage Ist**
■ To show the direction of flow of current in a circuit– **Galvanometer**	**RRB NTPC 19.01.2021 (Shift-I) Stage Ist SSC JE Electrical 24-03-2021 (Shift-II)**
■ Infrared optical _____ can be used for measuring and monitoring temperatures and hot spots of jet engine rotor blades- **Pyrometer**	**SSC CHSL 19/04/2021 (Shift-I)**
■ The instrument used in submarines to view objects above sea level is- **-Periscope**	**SSC JE Mechanical - 27/09/2019 (Shift-II) SSC MTS 09/08/2019 (Shift-III) RRB NTPC 10/04/2016 (Shift-III) Stage-I**
■ Odometer is an instrument that is used in motor vehicle for measuring- **-Distance**	**RRB Group–D, 10-10-2018 (Shift-III) RRB ALP & TECH (14.08.2018) Shift – I RRB Group –D, 25-10-2018 (Shift-II) RRB Group- D,05-11-2018(Shift-II)**
■ Tachometer is used for- **-RPM (Revolutions Per Minute)**	**RRB J.E. 2014(14-12-2014 ,Green Paper) RRB NTPC Stage-Ist 31.03.2016 (SHIFT-II) RRB S.S.E. 2014(21-12-2014 ,Set-08,Green Paper)**
■ Multimeter consist of- **-Voltmeter, Ammeter & Ohm meter**	**RRB J.E. 2014(14-12-2014, Green Paper)**

■ Instrument used for measuring density of liquid is- **-Hydrometer**	**RRB NTPC Stage-I[st] 05.04.2016 (SHIFT-I)**
■ Sudden fall in the barometer reading is an indication of …….. **Storm**	**SSC 10+2 CHSL 16.01.17, 10 am)**
■ Instrument for measuring light intensity is called- **Lucimeter**	**(SSC 10+2 CHSL 23.01.17, 4.15 pm)**
■ .....is type of Echolocation– **-Sonar**	**RRB Group –D, 01-11-2018 (Shift-II)**
■ Voltmeter is used for measuring- **-Voltage**	**RRB J.E., 29-05-2019(Shift-III) RRB Group –D, 27-09-2018 (Shift-III)**
■ Instrument for measuring rainfall is called- **Hyetometer**	**(SSC 10+2 CHSL 19.01.17, 10 am)**
■ A galvanometer can be converted to a voltmeter by connecting- **A high resistance in series**	**(SSC CGL (TIER-1) 03-09-2016, 4.15 pm)**
■ Instrument can be measured temperature without touching to object- **Infrared thermometer**	**RRB J.E. (14.12.2014, Green paper)**
■ Wind vane instrument is determines ____ **Direction of wind**	**SSC MTS – 15/05/2023 (Shift-I)**
■ Name the instrument that is used by meteorologists to measure the hemispherical area of incidence of solar radiation on a flat surface- **Pyranometer**	**SSC Selection Posts XI– 27/06/2023 (Shift-I)**
■ Seismograph is used to measurement of _____. **Earthquake**	**SSC CGL (Tier-1)– 17/07/2023 (Shift-II) SSC (10 + 2) CHSL 10.01.2017, 4:15 PM SSC JE Civil 23.03.2021 (Shift-I)**
■ A meteorological instrument, that consists of a funnel shaped collector, connected to a measuring tube and is used to measure the rain fall in per unit area over a specified period of time is- **Standard rain gauge**	**SSC CHSL 26/05/2022 (Shift-I)**
■ The meter that measures the speed of the vehicle is called_____. **Speedometer**	**RRB Group-D 05/11/2018 (Shift-I) SSC MTS 10-10-2017 (Shift-I)**
■ A device that can be used to test whether an object is carrying a charge or not is known as- **Electroscope**	**SSC JE Mechanical 27.10.2020 (Shift-I)**
■ The scientific instruments is used to measure the atmospheric pressure- **Barometer**	**SSC JE Mechanical 27.10.2020 (Shift-II) (SSC 10+2 CHSL 19.01.17, 10 am) (SSC CGL (TIER-1) 07-09-2016, 10 am) RRB NTPC 10.01.2021 (Shift-I) Stage-1[st]**
■ The relative humidity is measured with the help of- **Hygrometer**	**SSC JE Civil 29.10.2020 (Shift-I) SSC GD 14/02/2019 (Shift-II) (SSC 10+2 CHSL 27.01.17, 4.15 pm) (SSC CGL (TIER-1) 07-09-2016, 10 am) RRB NTPC 27/01/2021 (Shift-II) Stage-1st**
■ Instrument is used to measure the intensity of light produced by an unknown source in terms of a standard source- **Photometer**	**SSC CGL(Tier-I)-11/06/2019 (Shift-II)**

■ An eudiometer measures- **Volume of gases**	**(SSC CGL (TIER-1) 02-09-2016, 10 am)**
■ The Beaufort scale is used to measure- **Wind velocity**	**(SSC CGL (TIER-1) 03-09-2016, 10 am)**
■ Sphygmomanometer measures the blood pressure in the- **Arteries**	**(SSC CGL (TIER-1) 04-09-2016, 1.15 pm)**
■ The instrument used to measure Blood Pressure is- **Sphygmomanometer**	**(SSC 10+2 CHSL 15.01.17, 10 am) (SSC CGL (TIER-1) 04-09-2016, 4.15 pm)**
■ The sensory receptor related to blood pressure detection is- **Mechanoreceptor**	**(SSC CGL (TIER-1) 27-10-2016, 10 am)**
■ Instrument for measuring low temperatures is called- **Cryometer**	**(SSC 10+2 CHSL 08.02.17, 1.15 pm)**
■ Instrument for measuring work performed is called ..... **Ergometer**	**(SSC 10+2 CHSL 07.02.17, 4.15 pm)**
■ Device used for the detection and measurement of all types of radiation (alpha, beta and gamma)- **Geiger Counter**	**(SSC 10+2 CHSL 09.01.17, 4.15 pm)**
■ Instrument for measuring blueness of the sky or ocean is called..... **Cyanometer**	**(SSC 10+2 CHSL 01.02.17, 1.15 pm)**
■ Instrument for measuring time is called…… **Chronometer**	**(SSC 10+2 CHSL 23.01.17, 10 am)**
■ We measure specific gravity of milk by– **Using a hydrometer**	**(SSC 10+2 CHSL 18.01.17, 1.15 pm)**
■ Instruments is used for measuring electrical resistance- **Ohmmeter**	**SSC JE Electrical – 24/03/2021 (Shift-I**
■ The scientific instrument is used to measure the height of an aircraft above a fixed level- **Altimeter**	**SSC CHSL 13/04/2021 (Shift-I)**

(iv) Physical Quantities

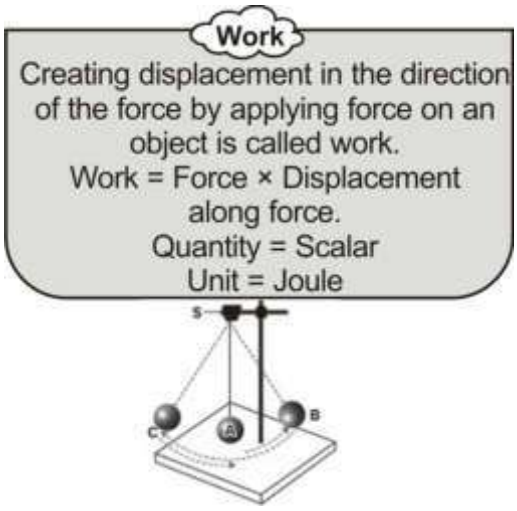


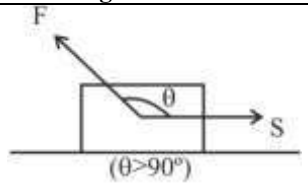
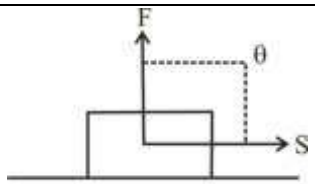
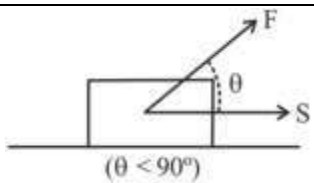
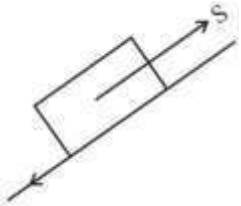
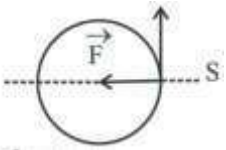
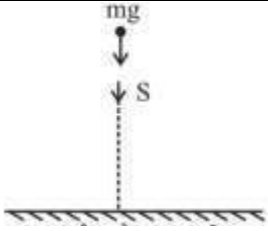
■ A scalar quantity is- **-Pressure**	**RRB Group-D 26-10-2018 (Shift-II)**
■ Work, kinetic energy and potential energy are– **Scalar quantities**	**Amin Examination 14-08-2016 (Paper-I)**
■ A vector quantity has both magnitude and direction, whereas a scalar quantity has only magnitude and no direction. Example of a vector quantity is– **Displacement**	**RRB Group-D 12-11-2018 (Shift-I)**
■ An example of vector quantity is– **Velocity**	**RRB NTPC Stage Ist 28.04.2016 (Shift-I)**
■ Quantity has both direction and magnitude– **-Momentum**	**RRB Group-D 05-11-2018 (Shift-II)**
■ Physical quantities, which have……..only and no…….are called scalar quantities- **Magnitude, Direction**	**(SSC 10+2 CHSL 16.01.17, 10 am)**

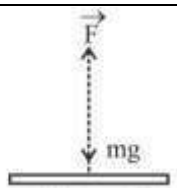
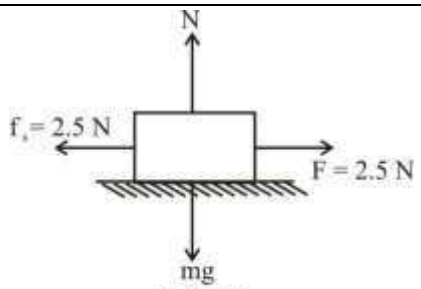
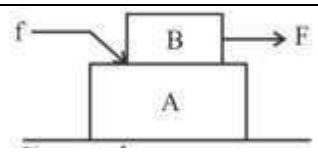
■ All the non-zero vectors are called _____. **Proper Vectors**	**SSC CGL–(Tier-I) 2308/2021 (Shift I)**
■ The vector quantity is- **-Force**	**RRB JE (14-12-2014, Red Paper)**
■ A scalar quantity is- **-Mass**	**RRB NTPC 28.12.2020 (Shift-II) Stage Ist**
■ In work– **-There is no direction , only have magnitude**	**RRB Group –D, 25-09-2018 (Shift-III)**
■ The physical quantity is equal to the expression, $\frac{\text{arc}}{\text{Radius}}$ = **Plane angle**	**SSC CGL (Tier-I) 18/04/2022 (Shift-I)**
■ Two vectors are said to be equal if- **Both magnitude and direction are same**	**(SSC CGL (TIER-1) 11-09-2016, 4.15 pm)**
■ A quantity or phenomenon that has two independent properties, magnitude and direction, called is- **Vector**	**SSC JE Mechanical - 27/09/2019 (Shift-II)**
■ The physical quantities is a scalar quantity- **Young's Modulus**	**(SSC 10+2 CHSL 07.01.17, 10 am)**

2. Mechanics

(i) Work



Negative Work	Zero Work	Positive Work
		
 Work done by Friction force at θ = 180°	 Motion of particle at circular path is θ = 90°	 Motion under gravitation (θ = 0°)

 Work done by gravitation (θ = 180º)	 As f = F, S = 0	 Work done by friction force on object A (θ = 0º)

■ Rolling a stone on a stopping road is easier than lifting it vertically because− **The work done in rolling a stone is less than in lifting it**	**Rajasva Lekhpal – 13-09-2015 (Morning)**
■ The gravitational potential energy of an object at a point above the ground is defined as the work done in_____. **-Lifting it from the ground to the point opposite gravity**	**Lower-I 28/02/2016 RRB Group –D, 22-10-2018 (Shift-II) UP UDA/LDA (Pre-2006)**
■ Capacity of doing work is known as- **-Energy**	**RRB ALP & Tec. 31-08-2018 (hift-III)**
■ If the value of work is positive then the kinetic energy of the body- **-Increase his energy**	**UPP Computer Operator Exam 19/05/2016 (Shift-II) RRB Group –D, 20-09-2018 (Shift-I)**
■ The position is no work done if– **Kapil stands with a weight of 10 kg on his shoulder**	**RRB Group –D, 19-09-2018 (Shift-III)**
■ The work done by the force is positive when- **-Displacement occurs in the direction of force**	**RRB Group –D, 19-09-2018 (Shift-III)**
■ Efficiency of work is known as- **-Energy**	**RRB Group –D, 16-11-2018 (Shift-II)**
■ Work present if there is – **-Force**	**RRB Group –D, 26-09-2018 (Shift-I)**
■ If displacement is horizontal to the applied force, then work done is– **-Positive**	**UP SSSC Cane Supervisor Exam 03/07/2016 (Paper-I) RRB Group –D, 26-10-2018 (Shift-II)**
■ Work done does not depend- **Mass of object**	**RRB Group –D, 09-10-2018 (Shift-II)**
■ The work done by a body does not depend on- **Initial velocity of object**	**RRB Group –D, 15-11-2018 (Shift-II) RRB Group –D, 12-12-2018 (Shift-I) Rajya Mandi Parishad 30/05/2019 (Shift-I)**
■ Work known as- **-Force × displacement**	**RRB Group –D, 08-10-2018 (Shift-I)**
■ When a man pushes a wall but fails to displace it, it does– **No any work**	**UP SI (Ranker)-2011 RRB Group –D, 12-12-2018 (Shift-II)**
■ To say that the work has been done, two conditions must be completed, one of them is- **-Object must be displaced**	**UPP Computer Operator Exam 19/05/2016 (Shift-II) RRB Group –D, 24-10-2018 (Shift-III)**
■ The work is product of– **-Force and Displacement of object towards the direction of force**	**RRB Group –D, 08-08-2018 (Shift-I) SSC CGL–(Tier-I) 17/08/2021 (Shift I)**
■ Work is done on a body only when– **-It experiences energy gain through a mechanical effect**	**RRB Group –D, 11-12-2018 (Shift-III)**

■ The work done if the angle between applied force and the direction of the displacement is 90^0- **-Zero**	**UP PCS (Pre) GS-2012 ACF/RFO (Mains-II)-2018 RRB Group –D, 10-12-2018 (Shift-III)**
■ The ability of an object to do the work energy contained in an object is depend on the- **-State and condition of object**	**RRB Group –D, 16-10-2018 (Shift-I)**
■ A moving car faces the wind in the opposite direction. The work done by the wind on the car is– **-Negative**	**RRB Group –D, 01-10-2018 (Shift-III)**
■ If an object not moving after applying a force, then we can say that– **-Any work has not done**	**ACF/RFO (Mains-II)-2018 RRB Group –D, 16-11-2018 (Shift-I) UPSSSC Lower Mains 21/10/2021 Paper-I**
■ If the displacement of an object is zero. Then work done by the applied force is– **-Zero**	**RRB Group –D, 16-11-2018 (Shift-I)**
■ The work done is zero with zero- **-Displacement**	**RRB Group –D, 11-10-2018 (Shift-I)**
■ Work can only be done when ___is present. **-Energy**	**RRB Group –D, 05-11-2018 (Shift-III)**
■ When the direction of the force applied and the direction of movement of the object is perpendicular to each other. **-No work done**	**RRB Group –D, 24-10-2018 (Shift-I)**
■ ……is the mechanical transfer of energy to a system or from a system by an external force on it. **Work**	**UP UDA/LDA (Pre-2006) (SSC 10+2 CHSL 07.02.17, 1.15 pm)**

Numerical Question

1. A force of 20 N displaces an object through 2 m and does a work of 20 J. The angle between the force and displacement is:

(a) 60^0 (b) 30^0
(c) 90^0 (d) 0^0

RRB ALP & Tec.(20-08-2018)Shift-II

Ans : (a) Given that,
F = 20N
d = 2m
W = 20J
$\Rightarrow$ Work (W) = F. d cosθ
$20 = 20 \times 2 \times \cos\theta$
$1 = 2\cos\theta$
$\cos\theta = 1/2$
$\cos\theta = \cos 60^0$
$\theta = 60^0$

2. A porter raise 12 kg object from surface of earth and put object 1.5 meter above from surface on his head. Calculate the work done on object ($g = 10\ ms^{-2}$).

(a) 140 J (b) 150 J
(c) 180 J (d) 150 J

RRB Group-D, 04.10.2018 (shift-I)

Ans : (c)
m = 12kg
$g = 10\ m/s^2$
h = 1.5m
So, if an object of mass (m) is raised through a height h, the work done on the object is equal to potential energy (mgh) of an object.
Therefore,
W = mgh
$= 12 \times 10 \times 1.5$
= 180J.

3. If an aeroplane travelled 4000m distance and work done is 20000J. Then force applied on it is

(a) 5 N (b) 50 N
(c) 0.20 N (d) 10 N

RRB Group –D, 10-12-2018 (Shift-I)

Ans : (a) Work = Force × Displacement
$20000 = \text{Force} \times 4000$
$F = 20000/4000$
$= 5\ N$

4. The work done, to increase speed 5 m/s to 10 m/s by a car of 800kg is.....

(a) 30kJ (b) 40kJ
(c) 20kJ (d) 10kJ

RRB Group-D 22-09-2018(Shift-II)

Ans : (a) Work done = change in kinetic energy
$= 1/2m(v_2^2 - v_1^2)$
$= 1/2 \times 800(10^2 - 5^2)$
$= ½ \times 800 \times 75$
$= 30000\ J = 30kJ$

5. An object of 1kg is dropped to the ground from a height of 30m. What is the work done by the force of gravity ? ($g = 10\ m/s^2$)

(a) 10J (b) 300J
(c) 0.33J (d) 30J

RRB Group-D 19-09-2018(Shift-I)

Ans : (b) m = 1 kg
$g = 10\ m/s^2$
h = 30 m
P.E. = mgh
Or work done by the force of gravity
$= 1 \times 10 \times 30 = 300$ Joule

6. A person picks up 20kg of goods at 2m above the ground and keeps it on his head, work done by the person is?

(a) 200J (b) 400J
(c) 40J (d) 20J

RRB Group-D 17-09-2018(Shift-II)

Ans : (b) Given that, m = 20 kg
height (h) = 2 m
$g = 10\ m/s^2$
$W = mgh = 20 \times 10 \times 2 = 400\ J$

7. When an object move 1m distance by 1N force on the direction of force then work done will-

(a) 10J (b) 100J
(c) 0.01J (d) 1J

RRB ALP & Tec.(20-08-2018)Shift-II

Ans : (d) Given, Force = 1 N, Distance = 1 m
Work done = F.d cosθ
$=1\times1\times\cos0^0$ (because force and displacement are in same direction)
Hence work done = 1J

8. A boy raises a box with a weight of 120 N through a height of 2 m. The work done by the boy is-

(a) 60 J (b) 120 J
(c) 240 J (d) 180 J

RRB ALP & Tec.(30-08-2018)Shift-I

Ans : (c) Given, Weight = mg = 120N, Height (h)= 2 m
Work done = mgh
= 120×2
= 240J.

9. If the work done is zero, then the angle between force and displacement is –

(a) 0º (b) 90º
(c) 45º (d) 30º

RRB Group –D, 08-10-2018 (Shift-II)
RRB Group –D, 17-09-2018 (Shift-II)

Ans : (b) We know that,
W = F.d cosθ
when, W = 0
0 = F.d cos θ
$\therefore \cos\theta = 0 = \cos 90^0$
$0 = 90^0$
In the case of zero work the angle between the displacement and the applied force is 90 degree.

10. 20 N force is acting on a body. Body moves 4 meter in direction of applied force, then work done is-

(a) 80W (b) 80Pa
(c) 80N (d) 80J

RRB Group –D, 05-10-2018 (Shift-II)

Ans : (d) Given, Force (F) = 20 N, Displacement (d) = 4 m
Work done (W) = F.dcosθ
[θ = 0º Displacement occurs in the direction of the force]
Work = 20 N × 4 m × cos 0º
Work = 20 N × 4 m × 1
Work = 80 Nm = 80 J

11. A worker takes 15kg object and put the object 1 meter above on his head from the surface of earth. Then work done by the worker is – (g = 10 ms^{-2}).

(a) 155J (b) 150J
(c) 140J (d) 100J

RRB Group –D, 05-10-2018 (Shift-II)

Ans : (b) Given, m = 15kg
$g = 10 m/s^2$
h = 1.0m
As work done by an object is equal to the potential energy stored in an object.
Therefore,
W = mgh = 15×10×1 = 150J.

12. A worker takes 10 kg of goods from the ground and puts it on 1.1m above the land on his head. What will be the work done by the worker.

(a) 140J (b) 155J
(c) 165J (d) 110J

RRB Group –D, 05-10-2018 (Shift-III)

Ans : (d) Given that,
m = 10 kg, $g = 10\ m/s^2$, h = 1.1 m
As workdone by an object is equal to the potential energy stored in an object.
Therefore, W= mgh
= 10× 10 ×1.1
= 10×10×11/10
= 110J

13. A girl whose weight is 200 N, climbs on a tree which height is 2-meter. What was the work done by the girl after climbing the tree? (g = 10 m /sec^2)

(a) 800J (b) 400J
(c) 200J (d) 2000J

RRB Group –D, 12-12-2018 (Shift-III)

Ans : (b) Given, Weight = mg = 200N
h = 2m
Work done by the girl = Potential energy
= mgh = 200×2 = 400J

14. If someone travels 15 km distance with a fixed force of 500N, then calculate the work done.

(a) 750000J (b) 75000J
(c) 7500000J (d) 7500J

RRB Group –D, 13-12-2018 (Shift-II)

Ans : (c) Force = 500N , Work = ?
Displacement = 15km = 15000m
Work = force×displacement
W = 500×15000
= 7500000J

15. A horizontal force of 10 N displaces an object of 5 kg to a distance of 2 m in the direction of the force. What will be the work done by the object?

(a) 20J (b) 5J
(c) 50J (d) 10J

RRB Group –D, 20-09-2018 (Shift-III)

Ans : (a) Work = force ×displacement in the direction of force
W = F×d
[∴ Given, F = 10N, d = 2m]
W = 10×2
= 20J

16. What is the amount of work done when an object moves under a force of 10 N at a distance of 10 m in the direction of force?
(a) 1J (b) 10J
(c) 100J (d) 0.01J

RRB Group –D, 31-10-2018 (Shift-II)

Ans : (c) Given,
d = 10m
F = 10N
Work = F.d
= 10×10
= 100J

17. A force of 50 N displaces an object 10 m. What will be the work done by the force?
(a) 500J (b) 5J
(c) 10J (d) 50J

RRB Group –D, 03-12-2018 (Shift-III)

Ans : (a) Given,
F = 50N, displacement = 10m, work =?
Work = force × displacement
W = 50×10 = 500J

18. A bus runs with a force of 4000 N. The work done by the bus is 2000 J. What is the distance covered by the bus?
(a) 1 meter (b) 2 meter
(c) 1.5 meter (d) 0.5 meter

RRB Group –D, 06-12-2018 (Shift-III)

Ans : (d) Given,
Force (F) = 4000 N
Work done (W) = 2000 J
Work = force × displacement
Displacement = Work/force
= 2000/4000 = 0.5 meter

19. If a man pulls a trolly by applying force of 50N and trolly is displaced 30m. What is work done?
(a) 1500J (b) 80J
(c) 1500J (d) 20J

RRB Group –D, 15-11-2018 (Shift-II)

Ans : (a) Given, Force = 50N
Displacement = 30m
Work = force × displacement
W = 50 × 30 = 1500J

20. A man puts 20kg object on his head by raising the object 2m above from the surface of earth. Then work done will be –
(a) 400W (b) 400J
(c) 200W (d) 200J

RRB Group –D, 30-10-2018 (Shift-II)

Ans : (b) Given,
m = 20 kg, g = 10 m/s^2, h = 2 m
Work done = Potential energy of object
W = mgh
= 20× 10× 2 = 400J

21. A force of 125 N is acting on an object, that object is moved up to 5 m in the direction of the force, what will be the work done by the force.
(a) 625W (b) 625Pa
(c) 625N (d) 625J

RRB Group –D, 09-10-2018 (Shift-I)

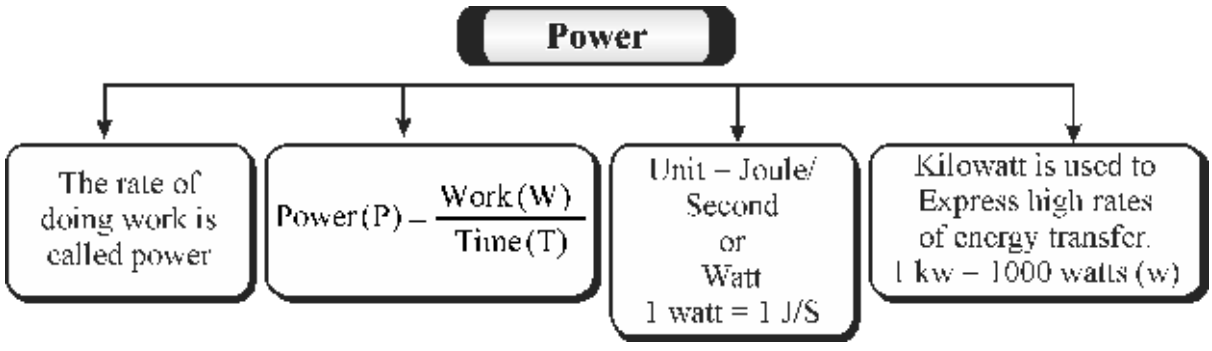
Ans : (d) Given,
Force (F) = 125N, displacement (d) = 5m
Work done (W) = Force × displacement
W = 125×5 = 625J

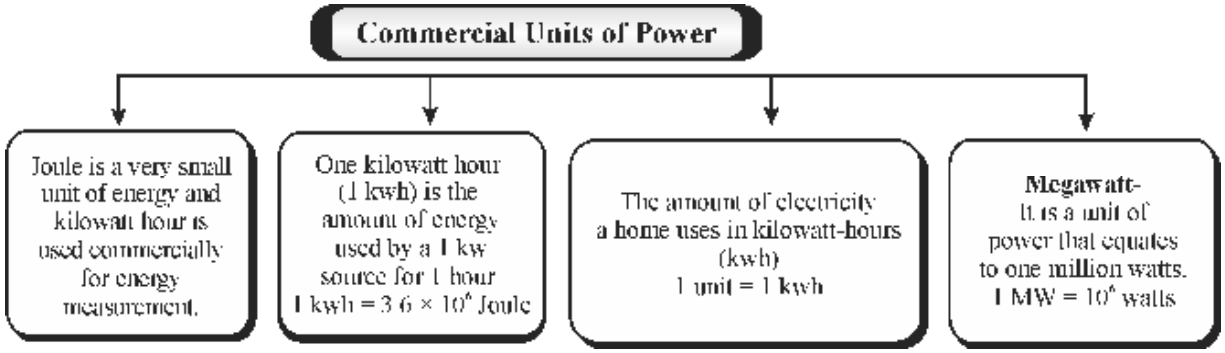
22. If a person pulls the trolley up to the distance of 10 m with the force of 50 N, what will be the work done by him ?
(a) 5J (b) 500J
(c) 20J (d) 0.2J

RRB Group –D, 27-09-2018 (Shift-I)

Ans : (b) Given,
Force (F) = 50N, Displacement (d) = 10m
W = F.d
W = 50×10
= 500 N-m or 500J

(ii) Power





■ Power is interpreted as– **Working rate or energy transfer rate**	**UP UDA/LDA (Pre-2006) RRB Group-D 19-09-2018(Shift-I)**
■ Rate of doing work is called– **-Power**	**RRB Group-D 05-10-2018 (Shift-I)**
■ If a man do 'W' work in 't' time, then his power 'P' will be- **-W/t**	**RRB Group-D 01-10-2018 (Shift-II) RPF SI 24.12.2018 (Shift - I)**
■ Name the physical quantity that is equal to the product of force and velocity. **-Power**	**RRB Group-D 10-12-2018 (Shift-I)**
■ A more powerful engine can do more work in less time like an aeroplane travel more distance as compare to a car in less time. So aeroplane is more powerful than a car. It is an example of– **-Power**	**RRB Group-D 29-10-2018(Shift-III)**
■ 1 horsepower approximately ——— watts. **746**	**SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III) UP UDA/LDA (Pre-2006) SSC CPO-SI 24/11/2020 (Shift-I) RRB Group-D 28-08-2022 (Shift-I)**

Numerical Question

1. If a boy covers a distance of 20 meters with 600 Newton force in 4 minutes, then the amount of power consumed by the boy is?

(a) 50watt (b) 100watt
(c) 80watt (d) 25watt

RRB ALP & Tec.(29-08-2018, Shift-III)

Ans : (a) Time taken by the boy = 4×60=240sec
Here, F=600N, and d=20m
Now, work done = 600×20=12000J
Total power consumed by the boy =12000/240=50 watt

2. A boy of 50 kg mass climbs 40 stairs in 9 seconds. If the height of each stair is 15cm, then find his power.($g= 10ms^{-2}$)

(a) 333.33W (b) 333.34J
(c) 333.34ms (d) 387.5W

RRB Group-D 23-10-2018(Shift-III)

Ans : (a) Height of 40 stairs = 40 x15=600cm=6m
m = 50 kg, h = 6 m, g = 10 m/s^2
Work done = mgh
= 50 × 10 × 6 = 3000J
Power = work done/time=3000/9=333.33Watt

3. Name the physical quantity that is equal to the product of force and velocity.

(a) Work (b) Energy
(c) Power (d) Acceleration

RRB Group-D 10-12-2018 (Shift-I)

Ans : (c) Power = work done/time
Work done = Force × displacement
Velocity = displacement/time
Power = Force × displacement/time
Power = Force × velocity
Power = F ×V

4. A 40 kg girl quickly climbs up the stairs to 5m height in 4 sec, what will be the power developed by her?

(a) 500W (b) 200W
(c) 2000W (d) 100W

RRB Group-D 18-09-2018(Shift-I)

Ans : (a) W = mgh
(here m= 40kg, g =10m/sec^2 and h=5m)
W = 40 × 10 × 5 = 400 × 5 = 2000
W = 2000 Joule
t = 4 s

$$P = \frac{W}{t}$$

Hence, $P = \frac{2000}{4} = 500$ watt

5. A boy of 50 kg mass climbs 45 stairs in 10 seconds. If the height of each stair is 16cm then find his power ?

(a) 337.5ms (b) 387.5W
(c) 360W (d) 360J

RRB Group-D 23-10-2018(Shift-II)

Ans : (c) Given, mass of boy, m = 50 kg
h = 45 x16 = 720 cm = 7.20 m
t = 10 s, g = 10 m/s^2
PE = mgh = 50 x 10 x 7.20 = 3600 J
Power = PE / time = 3600 / 10
= 360 J/s = 360W

6. A boy of 50 kg mass climbs 40 stairs in 10 seconds. If the height of each stair is 15cm, then calculate his power.(g= 10ms^{-2})

(a) 337.5W (b) 300J
(c) 300W (d) 300ms

RRB Group-D 23-10-2018(Shift-I)

Ans : (c) Given, mass of boy, m = 50 kg
h = 40 x15 = 600 cm = 6.0 m
t = 10 s, g = 10 m/s^2
PE = mgh = 50 x 10 x 6 = 3000 J
Power = PE / time
= 3000/ 10 = 300 W

7. A boy of 50 kg mass climbs 45 stairs in 9 seconds. If the height of each stair is 15cm, then calculate his power.(g= 10ms^{-2})

(a) 325W (b) 275W
(c) 475W (d) 375W

RRB Group-D 22-09-2018(Shift-I)

Ans : (d) Given,
mass of boy = 50 kg
h = 45 x15 = 675 cm = 6.75 m
t = 9 s, g = 10 m/s^2
PE = mgh = 50 x 10 x 6.75 = 3375 J
Power = PE / time = Energy / time
$= \frac{3375}{9} = 375$ J/s=375 W

8. If a girl with a weight of 40 N, climbs on the rope for 20 seconds with the power of 160 watts, then at which height will she reach?

(a) 80 meter (b) 4 meter
(c) 8 meter (d) 0.8 meter

RRB Group-D 18-09-2018(Shift-III)

Ans : (a) Let assume that girl climbs to the h meter.
Then, power = potential energy (work)/time
P = (mgh)/t
Here,
weight (mg) = 40N,t = 20 sec., Power (P) = 160W
160 = (40×h)/20
h = 80 meter

9. A boy of 50 kg mass climbs 44 stairs in 10 seconds. If the height of each stair is 15cm then find his power?

(a) 337.5ms (b) 387.5W
(c) 330J (d) 330W

RRB Group-D 24-09-2018(Shift-I)

Ans : (d) Given, mass of body, m = 50 kg
h = 44 x15 = 660 cm = 6.60 m
t = 10 s, g = 10 m/s^2
PE = mgh = 50 x 10 x 6.60 = 3300 J
Power consumed by the boy = PE/time = 3300/10 = 330 W

10. A boy of 50 kg mass climbs 43 stairs in 10 seconds. If the height of each stair is 15cm then find its power ?

(a) 337.5W (b) 325.5J
(c) 322.5W (d) 322.5ms

RRB Group-D 24-10-2018(Shift-III)

Ans : (c) Given, mass of boy, m = 50 kg
h = 43 x15 = 645 cm = 6.45 m
t = 10 s, g = 10 m/s^2
PE = mgh = 50 x 10 x 6.45 = 3225 J
Power of the boy = PE / time = 3225 / 10 = 322.5 W

11. What will be the average power required to lift an object of 80 kg to a height of 40 m in 50s ? (g=10m/s^2)

(a) 3200J/s (b) 640J/s
(c) 800J/s (d) 600 J/s

RRB Group-D 18-09-2018(Shift-III)

Ans : (b) Power required to lift this weight = mgh/t
p = (80 x 10 x 40) / 50
p = 640 J/s

12. A person does 1000J of work in 2s. What was the energy he spent ?

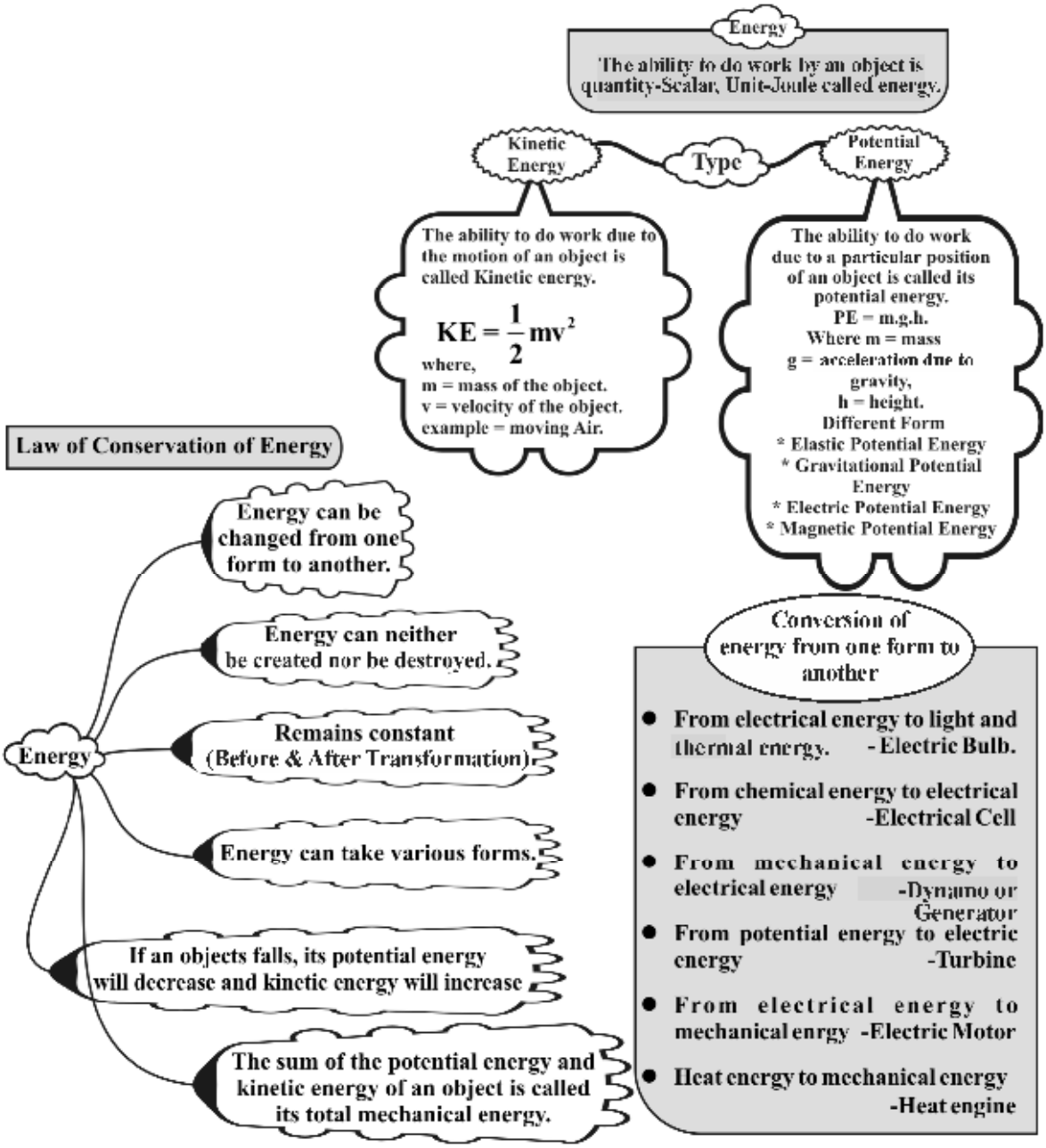
(a) 50W (b) 1000W
(c) 500W (d) 25W

RRB Group-D 17-09-2018(Shift-II)

Ans : (c) The working rate is called power. The unit of power is watt (W).

Power (P) =Work/time $= \frac{1,000}{2} = 500$W

(iii) Energy



Some Practical Untis of Energy

Unit	Symbol	Equivalence (in Joules)
Erg	erg	10^{-7} Joule
Calories	cal	4.2 Joule
Kilowatt Hour	kWh	3.6×10^{6} Joule
Electron volt	eV	1.6×10^{-19} Joule

■ The flowing water of other river transports _____ type of energy– **Kinetic Energy**	**Amin Examination 14-08-2016 (Paper-I)**
■ In wind power, the form of energy which is converted into electrical energy is– **Kinetic energy**	**UPPCS (Pre.) G.S. 2016 SSC CGL Tier-I 13/06/2019 (Shift-II)**
■ When the velocity of a moving object doubles, its kinetic energy will be– **Four times**	**UPPSC Asst. Forest Conservator Exam 2013 RRB Group-D 22-09-2018 (Shift-III)**

■ The heat energy supplied during temperature change stored in a substance into– **Kinetic energy**	**UPPSC AE- 2007 Paper (II)**
■ Windmill uses the energy of the wind in the form of– **Kinetic energy**	**RRB NTPC 09.02.2021 (Shift-II) Stage Ist**
■ If the air resistance is negligible, then the sum of the potential energy and kinetic energy of the freely falling object will be– **Constant**	**RRB Group-D 28-11-2018(Shift-I)**
■ The kinetic energy of_____particle is maximum– **-Gases**	**RRB Group-D 12-11-2018(Shift-III) RRB Group-D 26-10-2018(Shift-III)**
■ When a compressed spring is released, it converts its potential energy into- **-Kinetic energy**	**RRB Group-D 31-10-2018(Shift-III)**
■ The potential energy of an object increases with its- **-Height**	**RRB Group-D 10-10-2018(Shift-I) UP UDA/LDA (Pre-2006) RRB Group-D 11-10-2018(Shift-I)**
■ The form of energy that water stored in a dam primarily has is– **Potential energy**	**RRB Group-D 26-09-2018(Shift-I)**
■ A car running at high speed. It possesses– **Kinetic energy**	**UP PSC Food and Sanitary Inspector Exam-2013 RRB Group-D 19-09-2018(Shift-II)**
■ The form of energy that is always positive– **Kinetic energy**	**RRB Group-D 26-10-2018(Shift-III)**
■ When a compressed slinky (spring) is released, it changes the potential energy into_____. **Kinetic energy**	**RRB ALP. & Tec. 10-08-2018(Shift-I)**
■ The energy in a compressed spring is– **Potential energy**	**RRB Group-D 22-09-2018(Shift-II)**
■ The kinetic energy of an object increase by– **Speed**	**RRB Group-D 13-08-2018(Shift-I)**
■ The kinetic energy of a moving object depends on– **Mass and velocity**	**RRB ALP. & Tec. 14-08-2018(Shift-III) UP SSSC PET Exam-2022**
■ In a hydro power, the energy that is converted into electrical energy is– **Kinetic energy**	**RRB ALP. & Tec. 29-08-2018(Shift-I)**
■ The notable activities, potential energy has been converted into kinetic energy. **-Swinging of a pendulum**	**RRB ALP. & Tec. 31-08-2018(Shift-III)**
■ If the momentum of an object is tripled, its kinetic energy- **-Will be nine times the original value**	**RRB ALP. & Tec. 31-08-2018(Shift-II)**
■ The raised hammer have- **-Potential energy**	**RRB ALP. & Tec. 09-08-2018(Shift-III)**
■ The type of energy is there in a stretched rubber band- **-Potential energy**	**UPPCS RO/ARO-2017 (Mains) RRB ALP. & Tec. 14-08-2018 (Shift-III) RRB Group-D 10-10-2018 (Shift-I)**
■ _____can neither be created nor destroyed. **Energy**	**RRB ALP. & Tec. 14-08-2018(Shift-III) RRB Group-D 16-10-2018(Shift-III)**
■ The energy received by an object by its position and configuration is called– **-Potential energy**	**UPPSC AE Exam-2011 (Paper-II) RRB ALP. & Tec. 1-08-2018(Shift-I)**

■ A compressed spring possesses more energy than a spring of normal length because the compressed spring has– **-Potential energy**	**RRB ALP. & Tec. 20-08-2018(Shift-I)**
■ When a bullet is fired from a gun, its potential energy is converted into– **-Kinetic energy**	**RRB ALP. & Tec. 29-08-2018(Shift-III)**
■ The energy possessed by a body due to its change in position or shape is called- **-Potential energy**	**RRB Group-D 30-10-2018 (Shift-I)**
■ At the time of releasing an arrow in a drawn bow, the potential energy of the bow change **-Kinetic energy**	**RRB ALP. & Tec. 30-08-2018(Shift-I)**
■ There is a body falling from a mountain has– **-Both Kinetic energy and Potential energy**	**RRB Group-D 17-09-2018(Shift-III)**
■ Kinetic energy depends on- **both mass and velocity of the moving body**	**SSC CGL (TIER-1) 02-09-2016, 4.15 pm**
■ The bullet fired from the gun goes deep inside the target because it has– **-Kinetic energy**	**UPSSSC VDO 22/12/2018 (Shift-II)** **RRB Group-D 10-10-2018(Shift-III)**
■ By the turbines flowing water and wind are used for change in..... **-Kinetic energy into electric energy**	**RRB Group-D 16-11-2018 (Shift-III)** **RRB Group-D 23-10-2018 (Shift-I)**
■ The kinetic energy of a bullet when a bullet is fired from a gun- **-More than gun**	**RRB Group-D 22-09-2018 (Shift-I)**
■ Mechanical energy equal to- **-Kinetic energy+ potential energy**	**Lower-I 28/02/2016** **RRB Group-D 19-09-2018 (Shift-III)** **UPPSC AE-2008** **UP PSC Food and Sanitary Inspector Exam-2013** **RRB ALP. & Tec. 13-08-2018 (Shift-III)** **RRB Group-D 16-11-2018 (Shift-I)**
■ Formula for gravitational potential energy is- **U=mgh**	**RRB Group-D 23-10-2018(Shift-III)**
■ During the free falling of an object– **-The kinetic energy increase**	**RRB Group-D 15-11-2018(Shift-I)**
■ If the velocity of an object moving at a certain height is increase 4 times, then the change in the potential energy of the object will be– **-Potential energy will be constant**	**RRB Group-D 15-11-2018(Shift-II)**
■ While cycling energy converted into– **-The chemical energy is converted into muscular energy then kinetic energy**	**RRB Group-D 05-11-2018 (Shift-II)**
■ A compressed spring has.....energy compared to a normal spring. **-Greater**	**RRB Group-D 12-11-2018 (Shift-III)**
■ An object is dropped from a certain height to the ground. When it touches the ground it will contain- **-Kinetic energy**	**RRB Group-D 18-09-2018 (Shift-II)**
■ .....is known as the strength of an object. **-Energy**	**RRB Group-D 27-09-2018 (Shift-I)**
■ The unit of measurement of energy is– **Joule**	**SSC CHSL 19/10/2020 (Shift-I)**
■ The formula for finding the kinetic energy of an object is– **$1/2mv^2$**	**UPP Computer Operator Exam 19/05/2016 (Shift-II)** **RRB Group-D 10-10-2018(Shift-II)** **RRB ALP. & Tec. 17-08-2018(Shift-II)**
■ An example of potential energy is- **-Stored water in an elevated reservoir under the water supply system**	**UP SI (Ranker)-2011** **RRB Group-D 31-10-2018(Shift-II)**

■ The water flowing in a hydroelectric power station can run the turbine because it containes. **-Kinetic energy**	**RRB Group-D 02-11-2018(Shift-II)**
■ The water raised at a certain height has..... energy. **-Potential**	**RRB Group-D 15-11-2018(Shift-II)**
■ If a boy leaves a gas-filled balloon that goes upward direction, its potential energy will be? **-Increase**	**RRB Group-D 07-12-2018(Shift-I)**
■ The energy increases with speed– **-Kinetic energy**	**UP UDA/LDA (Pre-2006) RRB Group-D 24-10-2018(Shift-I)**
■ If a bullet is fired from the gun, comes backwards, the kinetic energy of the gun will be– **Less than the bullet**	**RRB Group-D 16-10-2018(Shift-I)**
■ An object was thrown vertically upwards and it reached a maximum height 'h' from the ground. While going over it, the object at 1/4 of height 'h' will have …… **-Less potential energy and more kinetic energy**	**RRB Group-D 28-11-2018 (Shift-I)**
■ The form of energy that is not generated when riding a bicycle is- **-Chemical energy**	**RRB ALP & Tec. (10-08-18, Shift-I)**
■ The type of energy is associated with falling coconuts, high speed cars, rolling stones and flying planes **-Kinetic energy**	**SSC CGL Mains - 26/10/2023 (Shift-I) RRB Group-D 24-09-2018 (Shift-II)**
■ Wind turbines convert ____ energy into mechanical power. **Kinetic**	**UP PCS (Pre) GS-2011 SSC CGL(Tier-I)-13/06/2019 (Shift-II)**

Numerical Question

1. If the momentum of an object is tripled, its kinetic energy-

(a) Will be become tripled of original value
(b) Will remain unchanged
(c) Will be nine times the original value
(d) Will be six times the original value

RRB ALP. & Tec. 31-08-2018(Shift-II)

Ans : (c) $KE = \frac{1}{2}mv^2 = \frac{1}{2}\frac{(mv)^2}{m}$

$KE = \frac{1}{2}\left(\frac{p^2}{m}\right)$

$(KE)_1 \propto p^2$

Given

$\frac{(KE)_2}{(KE)_1} = \left(\frac{p_2}{p_1}\right)^2 = \left(\frac{3p}{p}\right)^2$

$KE_2 = 9\ KE_1$

2. If the velocity of an object becomes twice that of its initial velocity, then its kinetic energy become n times of its initial kinetic energy. Then what would be the value of n?

(a) 3 (b) 4
(c) 1/2 (d) 6

RRB ALP. & Tec. 13-08-2018(Shift-II)

Ans : (b) When velocity of an object becomes twice that of its initial velocity.

$n.(K.E) = \frac{1}{2}m.(2v)^2$

$n.(K.E) = 4 \times \frac{1}{2}mv^2$

$n.(K.E) = 4 \times K.E.$

n= 4

3. Two steel balls of mass 5 kg and 10 kg have same kinetic energy, which ball is moving fast.

(a) Kinetic energy does not depend on the speed of the system.
(b) 5 kg ball is moving fast
(c) Both balls are moving at the same speed
(d) 10kg ball is moving fast

RRB ALP. & Tec. 30-08-2018(Shift-I)

Ans : (b) Let, velocity of 5kg ball $=v_1$

And, velocity of 10 kg ball $=v_2$, $\left[\because K.E = \frac{1}{2}mv^2\right]$

$\frac{1}{2}m_1v_1^2 = \frac{1}{2}m_2v_2^2$

$\frac{1}{2} \times 5v_1^2 = \frac{1}{2} \times 10v_2^2$

$v_1^2 = 2v_2^2$

$\Rightarrow v_1 > v_2$

$\therefore$ 5 kg ball is moving fast.

4. What will be the value of the kinetic energy of an object moving along the mass of 'm' if its speed is changed from 'v' to 2v '?

(a) $E_k/2$
(b) $4E_k$
(c) there will be no change in E_k
(d) $2E_k$

RRB ALP. & Tec. 09-08-2018(Shift-III)