Railway Recruitment Board

RRB ALP

CBT-2

Part A : Non-Technical
&
Part B : ITI Trade Mechanical Group

Solved Papers

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CONTENT

RRB ALP Stage-II

Technicians (Mechanic)

Syllabus of Semester System For The Trade of
FITTER
UNDER CRAFTSMAN TRAINING SCHEME (CTS)
By Government of India Ministry of Labour & Employment (DGE&T)

First Semester–

■ **Trade Theory :–** Importance of safety and general precautions observed in the industry/shop floor. All necessary guidance to be provided to the new comers to become familiar with the working of Industrial Training Institute system including stores procedures. Soft Skills : its importance and Job area after completion of training. Introduction of First aid. Operation of electrical mains. Introduction of PPEs. Introduction to 5S concept & its application. Response to emergencies e.g. : power failure, fire, and system failure.

Linear measurements – its units, dividers, calipers, hermaphrodite, centre punch, dot punch, their description and uses of different types of hammers. Description, use and care of 'V' Blocks, marking off table.

Bench vice construction, types, uses, care & maintenance, vice clamps, hacksaw frames and blades, specification, description, types and their uses, method of using hacksaws.

Files– specifications, description, materials, grades, cuts, file elements, uses. Measuring standards (English, Metric Units), angular measurements, subdivisions, try square, ordinary depth gauge, protractor- description, uses and cares.

Marking off and layout tools, dividers, scribing block, odd leg calipers, punches-description, classification, material, care & maintenance.

Calipers– types, material, constructional details, uses, care & maintenance of cold chisels- materials, types, cutting angles.

Marking media, marking blue, Prussian blue, red lead, chalk and their special application, description. Use, care and maintenance of scribing block.

Surface plate and auxiliary marking equipment, 'V' block, angle plates, parallel block, description, types and uses, workshop surface plate - their uses, accuracy, care and maintenance. Types of files - convexing, taper, needle, care and maintenance of files, various types of keys, allowable clearances & tapers, types, uses of key pullers.

Physical properties of engineering metal : colour, weight, structure, and conductivity, magnetic, fusibility, specific gravity. Mechanical properties : ductility, malleability hardness, brittleness, toughness, tenacity, and elasticity.

Power Saw, band saw, Circular saw machines used for metal sections cutting.

Micrometer – outside and inside– principle, constructional features, parts graduation, leading, use and care. Micrometer depth gauge, parts, graduation, leading, use and care. Digital micrometer.

Vernier calipers, principle, construction, graduations, reading, use and care. Vernier bevel protractor, construction, graduations, reading, use and care, dial Verrnier Caliper, Digital vernier caliper.

■ **Drilling processes : –** common type (bench type, pillar type, radial type), gang and multiple drilling machine. Determination of tap drill size.

Revision & Test

Safety precautions to be observed in a smith shop, forge-necessity, description uses, fuel used for heating, bellows blowers, description and uses.

Anvil and swage blocks, Description and uses. Forging tools– hammers – band and sledge, description and uses. Chisels, set hammers, flatters, hardier, fuller swage & uses. Measuring and checking tools – steel rule, brass rule, calipers, try square, description and uses. General idea about the main operations performed in a forging shop such as upsetting drawing, twisting, bending, punching, drilling, and welding.

Metallurgical and metal working processes such as Heat treatment, various heat treatment methods - normalizing, annealing, hardening, case hardening and tempering Power hammer – construction, features, method of operating and uses.

safety precautions to be observed in a sheet metal workshop, sheet and sizes, Commercial sizes and various types of metal sheets, coated sheets and their uses as Per BIS specifications.

Marking and measuring tools, wing compass, Prick punch, tin man's square tools, snips, types and uses. Tin man's hammers and mallets type- sheets metal tools, Soldering iron, types, specifications, uses. Trammel – description, parts, uses. Hand grooves– specifications and uses.

Stakes – bench types, parts, their uses. Various types of metal joints, their selection and application, tolerance for various joints, their selection & application. wired edges-

■ **Solders** – composition of various types of solders, and their heating media of soldering iron, fluxes types, selection and application- joints.

■ **Rivets –** Tin man's rivets types, sizes, and selection for various works.

Riveting tools, dolly snaps description and uses. Method of riveting, shearing machine – description, parts and uses.

Second Semester–

■ **Safety –** importance of safety and general precautions observed in a welding shop. Precautions in electric and gas welding. (Before, during, after) Introduction to safety equipment and their uses. Machines and accessories, welding transformer, welding generators.

■ **Hand tools : –** Hammers, welding description types and uses, description, principle, method of operating, carbon dioxide welding. H.P. welding equipment : description, principle, method of operating L.P. welding equipment : description, principle, method of operating. Types of Joints – Butt and fillet as per BIS SP ; 46–1988 specifications. Gases and gas cylinder description, kinds, main difference and uses.

Setting up parameters for ARC welding machines– selection of Welding electrodes.

Oxygen acetylene cutting – machine description, parts, uses, method of handling, cutting torch– description, parts, function and uses.

■ **Drill–** material, types, (Taper shank, straight shank) parts and sizes. Drill angle–cutting angle for different materials, cutting speed feed. R.P.M. for different materials. Drill holding devices– material, construction and their uses.

Counter sink, counter bore and spot facing – tools and nomenclature, Reamer – material, types (Hand and machine reamer), kinds, parts and their uses, determining hole size (or reaming), Reaming procedure. Screw threads : terminology, parts, types and their uses. Screw pitch gauge : material parts and uses. Taps British standard (B.S.W., B.S.F., B.A. & B.S.P.) and metric/BIS (course and fine) material, parts (shank body, flute, cutting edge). Tap wrench : material, parts, types (solid & adjustable types) and their uses removal of broken tap, studs (tap stud extractor.)

■ **Dies : –** British standard, metric and BIS standard, material, parts, types, Method of using dies. Die stock : material, parts and uses.

■ **Drill troubles : –** causes and remedy. Equality of lips, correct clearance, dead centre, length of lips. Drill kinds : Fraction, metric, letters and numbers, grinding of drill.

■ **Grinding wheel : –**Abrasive, grade structures, bond, specification, use, mounting and dressing. Bench grinder parts and use–radius gauge, fillet gauge, material, construction, parts function and metric, different dimensions, convex and concave uses care and maintenance.

Radius gauge, feeler gauge, hole gauge, and their uses.

■ **Interchangeability : –** Necessity in Engg, field definition, BIS. Definition, Types of limit, terminology of limits and fits–basic size, actual size, deviation, high and low limit, zero line, tolerance zone Different standard systems of fits and limits. British standard system, BIS system

■ **Method of expressing tolerance as per BIS Fits : –** Definition, types description of each with sketch. Vernier height gauge : material construction, parts, graduations (English & Metric) uses, care and maintenance, Pig Iron : manufacturing process (by using) Blast furnace types, of pig Iron, properties and uses.

■ **Cast Iron :** – manufacturing process by using (cupola furnace) types, properties and uses.

■ **Wrought ion–** manufacturing process (Fuddling and Astor process) properties and uses.

■ **Steel :–** manufacturing process plain carbon steel, types, properties and uses.

Non–ferrous metals (copper, aluminum, tin, lead, zinc) properties and uses.

Counter sink, counter bore and spot facing – tools and nomenclature, Reamer – material, types (Hand and machine reamer), kinds, parts and their uses, determining hole size (or reaming), Reaming procedure.

■ **Simple scraper –** cir., flat, half round, triangular and hook scraper and their uses. blue matching of scraped surfaces (flat and curved bearing surfaces)

Vernier micrometer, material, parts, graduation, use, care and their uses. Blue matching of scraped surfaces (flat and curved bearing surfaces)

Vernier micrometer, material, parts, graduation, uses, care and maintenance. Calibration of measuring instruments.

Introduction to mechanical fasteners and its uses.

Screw thread micrometer : Construction, graduation and use.

Dial test indicator, construction, parts, material, graduation, Method of use,. Care and maintenance. Digital dial indicator.

■ **Comparators –** measurement of quality in the cylinder bores.

■ **Preventive maintenance –** objective and function of P.M. section inspection. Visual and detailed, lubrication

survey, system of symbol and colour coding. Revision, simple estimation of materials, use of handbooks and reference table.

Possible causes for assembly failures and remedies.

Assembling techniques such as aligning, bending, fixing, mechanical jointing, threaded jointing, sealing, and torquing. Dowel pins; material, construction, types, accuracy and uses.

Third Semester–

Safely precautions to be observed while working on a lathe, Lathe specifications, and constructional features. Lathe main parts descriptions – bed, head stock, carriage, tail stock, feeding and thread cutting mechanisms. Holding of job between centers, works with catch plate, dog, simple description of a facing and roughing tools and their applications.

■ **Lathe cutting tools–** Brief study of the nomenclature of Lathe cutting tools and necessity of correct grinding, solid and tipped, throw away type tools, cutting speed and feed and comparison for H.S.S, carbide tools. Use of coolants and lubricants.

Chucks and chucking the independent four–jaw chuck. Reversible features of jaws, the back plate, Method of clearing the thread of the chuck– mounting and dismounting, chucks, chucking true, face plate, drilling– method of holding drills in the tail stock, Boring tools and enlargement of holes.

Chucks and chucking the independent four- jaw chuck. Reversible features of jaws, the back plate, Method of clearing the thread of the chuck – mounting and dismounting, chucks, chucking true, face plate, drilling – method of holding drills in the tail stock, Boring tools and enlargement of holes.

■ **General turning operations–** parallel or straight, turning. Stepped turning, grooving, and shape of tools for the above operations. Appropriate method holding the tool on tool post or tool rest, Knurling tools description, grade, uses, speed and feed calculation.

■ **Taper–** definition, use and method of expressing tapers. Standard tappers– taper, calculations morse taper.

■ **Screw thread definition –** uses and application. Terminology of screw threads. square, worm, buttress, acme (non standard-screw threads), Principle of cutting screw thread in centre lathe – principle of chasing the screw thread – use of centre gauge, setting tool for cutting internal and external threads, use of screw pitch gauge for checking the screw thread.

■ **Screws : –** material, different types (inch & metric), uses

Testing scraped surfaces : ordinary surfaces without a master plate.

■ **Special files : –** types (pillar, Dread naught, Barrow, warding) description.

■ **System of drill size Fractional size : –** number, letter and metric. Templates and gauges– Introduction, necessity, types. Limit gauge: Ring gauge, snap gauge, plug gauge, description and uses.

Description and uses of gauge – types (feeler, screw, pitch, radius, wire gauge)

■ **Slip gauge : –** Necessity of using, classification & accuracy, set of blocks (English and Metric). Details of slip gauge. Metric sets 46 : 103 : 112, Wringing and building up of slip gauge and care and maintenance.

Application of slip gauges for measuring, Sine bar– Principle, application & specification. Procedure to check adherence to specification and quality standards.

Locking device : Nuts – types (lock nut castle nut, slotted nuts, swam nut, grooved nut) Description and use.

■ **Lapping : –** Application of lapping, material for lapping tools, lapping abrasives, charging of lapping tool. Surface finish importance, equipment for testing – terms relation to surface finish. Equipment for tasting surfaces quality – dimensional tolerances of surface finish.

■ **Honing : –** Application of honing, material for honing, tools shapes, grades, honing abrasives. Frosting – its aim and the methods of performance.

■ **Bearing –** Introduction, classification (Journal and Thrust), Description of each, ball bearing : Single row, double row, description of each, and advantages of double row.

■ **Roller and needle bearing :** Types of roller bearing. Description & use of each Industrial visit.

■ **Synthetic materials for bearing : –** the plastic laminate materials, their properties and uses in bearings such as phenolic, teflon polyamide (nylon).

Method of fitting ball and roller bearings

■ **Bearing metals –** types, composition and uses, lubricants purpose of using different types, description and uses of each type.

Hardening and tempering, purpose of each method, tempering colour chart.

Annealing and normalising, purpose of each method.

Fourth Semester–

Case hardening and carburising and its methods, process of carburising (solid, liquid and gas).

■ **Solder and soldering : –** Introduction – types of solder and flux. Method of soldering, Hard solder – Introduction, types and method of brazing.

Production of gauges, templates and jigs. The objective of importance ofr preparing interchangeable components.

■ **Drilling jig–** constructional features, types and uses. Fixtures – Constructional features, types and uses.

■ **Pipes and pipe fitting –** commonly used pipes. Pipe schedule and standard sizes. Pipe bending methods. Use of bending fixture, pipe threads – Std. Pipe threads Die and tap, pipe vices.

■ **Standard pipefitting : –** Methods of fitting or replacing the above fitting, repairs and erection on rainwater drainage pipes and house hold taps and pipe work. Use of tools such as pipe cutters, pipe wrenches, pipe dies, and tap, pipe bending machine etc.

Fire precautions– causes and types of fires, precautions against out break of fire, Fire Extinguishers – types and use.

Working material with finished surface of aluminum, duralumin, stainless steel,, the importance of keeping the work free from rust and corrosion. The various coating used to protect metals, protection coat by heat and electrical deposit treatments.

Treatments and provide a pleasing finish as chromium silver plating and nickel plating, and galvanising.

Aluminium and its alloys. Uses, advantages and disadvantages, weight and strength as compared with steel.

Tapers on keys and cotters permissible by various standards. Discuss non–ferrous metals as brass, phosphor bronze, gunmetal, copper, aluminium etc. Their composition and purposes where and why used, advantages for specific purposes, surface wearing properties of bronze and brass.

Power transmission elements. The object of belts; their sizes and specifications, materials of which the belts are made, selection of the type of belts with the consideration of weather, load and tension methods of joining leather belts.

Vee belts and their advantages and disadvantages, Use of commercial belts, dressing and resin creep and slipping, calculation.

Power transmissions, coupling types–flange coupling,– Hooks coupling – universal coupling and their different uses.

Pulleys– types– solid, split and 'V' belt pulleys, standard calculation for determining size crowning of faces–loose and fast pulleys–jockey pulley. Types of drives–open and cross belt drives. The geometrical explanation of the belt drivers at an angle.

■ **Power transmission –** by gears, most common form spur gear, set names of some essential parts of the set– the pitch circles, Diametral pitch, velocity ratio of a gear set, Helical gear, herring bone gears, bevel gearing, spiral bevel gearing, hypoid gearing, pinion and rack, worm gearing, velocity ration of worm gearing. Repair to gear teeth by building up and dovetail method.

Method or fixing geared wheels for various purpose drives, General cause of the wear and tear of the toothed wheels and their remedies, method of fitting spiral gears, helical gears, bevel gears, worm and worm wheels in relation to required drive. Care and maintenance of gears.

■ **Lubrication and lubricants –** Method of lubrication. A good lubricant, viscosity of the lubricant, Main property of lubricant. How a film of oil is formed in journal. Bearings, method of lubrication– gravity feed, force (pressure) feed, splash lubrication. Cutting lubricants and coolants : Soluble off soaps, suds– paraffin, soda water, common lubricating oils and their commercial names, selection of lubricants. Chains wire ropes and clutches for power transmission. Their types and brief description. Discuss the various rivets shape and form of heads, riveting tools for drawing up the importance of correct head size. the spacing of rivets. Flash riveting, use of correct tools, compare hot and cold riveting.

Importance of Technical English terms used in industry – (in simple definition only) Technical forms, process charts, activity logs, in required formats of industry, estimation, cycle time, productivity reports, job cards.

Installation, maintenance and overhaul of machinery and engineering equipment and Hydraulics & pneumatic symbols & exercise. Hydraulics pneumatic circuits. Clutch : Type positive clutch (straight tooth type, angular tooth type).

■ **Washers –** Types and calculation of washer sizes. The making of joints and fitting packing. The uses of lifting appliances, extractor presses and their use. Practical method of obtaining mechanical advantage. The slings and handling of heavy machinery, special precautions in the removal and replacement of heavy parts.

■ **Foundation bolt : –** types (rag, Lewis cotter bolt) description of each erection tools, pulley block, crow bar, spirit level, Plumb bob, pipe 2 × 4', wire rope, manila rope, wooden block.

RRB Assistant Loco Pilot Technicians 2018
Trade Mechanic Diesel
Solved Paper

Exam Date: 08.02.2019] **[Timing: 10:00 am to 12:30 pm]**

PART-A : NON-TECHNICAL

1. How many medals did India win in the Jakarta Palembang 2018 Asian Games?
(a) 69 (b) 160 (c) 21 (d) 101

Ans. (a) : Asian Games 2018 , also known as Jakarta-palembang 2018, were held in Indonesia. China topped the medal tally, while India won 69 medals including 15 Golds, 24 silvers and 30 Bronze.
Asian Games 2022 will be held at-
Hangzhou, China in 2023(due to covid pandemic)

2. Who among the following scientists discovered radium, a radioactive element?
(a) Amedeo Avogadro (b) Leonhard Euler
(c) Marie Curie (d) Louis Pastuer

Ans. (c) : Marie curie discoverd radium, which is a radioactive element. She also discoverd polonium. She is the only lady to win two Nobel prizes in two fields namely Physics and chemistry in 1903 and 1911 respectively.

3. Who among the following built the Alai Darwaza in 1311 in Delhi?
(a) Firoz Shah Tughlaq
(b) Ala-ud-din-Khilji
(c) Ittutmish
(d) Muhammad bin Tughlaq

Ans. (b): Alai Darwaza was built in 1311 in Delhi by sultan Ala-ud-din-khilji-(Ali Gurshasp). He instituted a number of significant administrative changes. He was the successor of Jalaluddin khilji. He followed Divine Right theory of kingship.

4. Who among the following besides Virat Kohli won the Rajiv Gandhi Khel Ratna award in 2018?
(a) Smriti Mandhana (b) Mirabai Chanu
(c) Devendra Jhajharia (d) Satish Kumar

Ans. (b): Saikhom Mirabai chanu won the Rajiv Gandhi Khel Ratna Award in 2018 (now Major Dhyanchand Khel Ratna), the highest sporting honour of India. Mirabai is a weight lifter, she recently won Gold medal in CWG (commonwealth Games) 2022 in Birmingham, England. She belongs to the state of Manipur.

5. The book ''We, the People'' was written by?
(a) Khushwant Singh (b) Jawaharlal Nehru
(c) Nani Palkhivala (d) Ramchandra Guha

Ans. (c) : The book "We the people" was written by Nani Palkhivala. He was a famous Indian Jurist and economist. We the Nation, Taxation in India, India's Priceless Heritage are some other famous books written by him.

6. When was the Constitution of India adopted by the constituent assembly?
(a) 26th January, 1950 (b) 26th December, 1949
(c) 26th November, 1949 (d) 26th October, 1949

Ans. (c): Constitution of India was officially adopted by constituent assembly on 26th November, 1949, and came into force on 26th January 1950.

7. Where is the headquarters of UNSECO located?
(a) Geneva (b) Rome
(c) New York (d) Paris

Ans. (d): Headquaters of UNESCO i.e. United Nations Educational, Scientific and Cultural Organisation is in Paris, France. It was founded in 1945 and has 193 member states.

8. Who among the following was appointed as the 25th Governor of RBI in December, 2018?
(a) Urjit Patel (b) Hasmukh Adhia
(c) Piyush Goyal (d) Shaktikanta Das

Ans. (d): RBI is the Central Bank of India. Shaktikanta Das was appointed as the 25th Governor of RBI in December 2018 and since then he has been holding this post. RBI was established on April 1, 1935 (RBI Act, 1934). It has 4 Deputy Governors-
(i) MD Patra
(ii) M. Rajeshwar Rao
(iii) T. Rabi Shekar
(iv) Mahesh K. Jain

9. Ustad Amjad Ali Khan is famous for playing which of the following instruments?
(a) Tabla (b) Flute
(c) Sarod (d) Harmonium

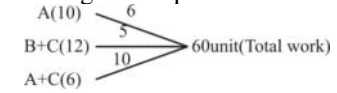
Ans. (c): Ustad Amjad Ali Khan is a- famous Sarod player, Alla Rakha Khan and Zakir Hussain are related to Tabla.
Hari Prashad Chaurasiya is related to flute and R.K. Bijapure is a famous harmonium player.

10. Chhau is a popular folk dance of which region of India?
(a) North (b) West
(c) South (d) East

Ans. (d): Chhau is a popular folk dance of Eastern region of India. It is famous in the Indian states of west Bengal, Odisha and Jharkhand. It involves martial arts, acrobatics with religious themes found in Shavism, Shaktism and Vaishnavism.

11. A can complete a piece of task in 10 hours; B and C together can complete it in 12 hours, while A and C together can complete it in 6 hours. How long will B alone take to complete it?
(a) 30 hours (b) 40 hours
(c) 50 hours (d) 60 hours

Ans. (d): According to the question .



A+(B+C) = 6+5 = 11 unit/hour

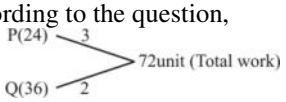
(A+B+C)–(A+C) = 11–10 = 1 unit / hour

$\therefore$ time taken by B to complete the work = $\frac{60}{1}$ = 60hours.

12. P can finish a task in 24 days and Q can do the same task in 36 days. Q worked for 12 days and left the job. In how many days, P alone can finish the remaining task?

(a) 60 days (b) 12 days
(c) 14 days (d) 16 days

Ans. (d): According to the question,



Work done by Q in 12 days = 12×2 = 24 unit

Remaining work = 72-24 = 48 unit

Hence, Remaining work completed by P in= $\frac{48}{3}$ = 16 days

13. A bullet train covers a certain distance at a speed of 180 kmph in 4 hours. To cover the same distance in 3 hours, it must travel at a speed of.

(a) 240 km/hr (b) 360 km/hr
(c) 12 km/hr (d) 280 km/hr

Ans. (a): Let the speed be x km/hr to cover the same distance in 3hrs

If distance is same then

$x \times 3 = 180 \times 4$

$\Rightarrow \quad x = \frac{180 \times 4}{3}$

$\Rightarrow \quad x = 240$ km /hr

14. If selling price is doubled, the profit becomes four times. Find the profit.

(a) 100% (b) 200% (c) 50% (d) 40%

Ans. (c): Let CP be Rs. x and SP be Rs. y

According to the question,

$4(y-x) = (2y-x)$

$\Rightarrow \quad 4y - 4x = 2y - x$

$\Rightarrow \quad 2y = 3x$

$\Rightarrow \quad y = \frac{3}{2}x$

Profit = $y - x = \frac{3}{2}x - x = \frac{x}{2}$

$\therefore$ Profit % = $\frac{x/2}{x} \times 100 = 50\%$

15. A shopkeeper expects a gain of 50% on his cost price. If in a week, his sale was of ₹450, what was his profit?

(a) ₹200 (b) ₹180
(c) ₹250 (d) ₹150

Ans. (d): Given

Gain = 50% = $\frac{1}{2}$

Let CP be 2unit and SP be 3 unit

$\because$ 3 unit = 450 (Given)

1 unit = 150

$\therefore$ Profit = 3u-2u = 1u = 1×150 = ₹150

16. A certain amount of principal fetched a total simple interest of ₹4,800 at the rate of 12% per year, in 5 years. What is the principal amount?

(a) ₹20,000 (b) ₹18,000
(c) ₹8,000 (d) ₹15,000

Ans. (c): Given

Simple Interest = ₹4,800

Rate (R) = 12%

time (T) = 5years

$\because$ SI = $\frac{P \times R \times T}{100}$

$4800 = \frac{P \times 12 \times 5}{100}$

P = ₹ 8000

Hence, the principal amount is ₹8000.

17. A fruit seller had some apples. He sells 30% apples and still has 630 apples. Originally, he had_____apples.

(a) 800 (b) 900
(c) 1,000 (d) 850

Ans. (b): Let total apples be x.

According to the question,

$x \times \frac{70}{100} = 630$

x = 900

Hence, total number of apples is 900.

18. In a mixture of 100 litres, the ratio of milk and water is 3:2. If this ratio is to be 1:2, then the quantity of water to be further added is.

(a) 60 liters (b) 120 liters
(c) 80 liters (d) 100 liters

Ans. (c): Mixture quantity = 100L

Ratio of milk and water = 3:2

Milk in mixture = $\frac{3}{2} \times 100 = 60$L

water in mixture = 100 – 60 = 40L

Let x litre water to be added in the mixture

$\frac{60}{40+x} = \frac{1}{2}$

$\Rightarrow 40+x = 120$

$\Rightarrow$ x = 80 litre

Hence, option (c) is correct.

19. If today is Monday, then after 65 days, it would be a.

(a) Wednesday (b) Saturday
(c) Tuesday (d) Thursday

Ans. (a): Now, by converting 65 days into weeks and days $\rightarrow$ 9 weeks and 2 odd days

9 weeks 63 days will be divided by 7, with remainder = 0

So, there are 2 odd days

Reference day is Monday and two odd days$\rightarrow$ two days after Monday is Wednesday

Hence, Wednesday is correct answer.

20. The value of 1120 X 1230 is.

(a) 1377600 (b) 1377800
(c) 1433600 (d) 1477800

Ans. (a): $\therefore$ Value of 1120×1230 = 1120×1230

= 1377600

21. Find the missing number.
(?) – 22731-43211 = 10601
(a) 75643 (b) 76543
(c) 76534 (d) 75463

Ans. (b) : Given ,
(?)–22731–43211 = 10601
⇒ (?) – (22731+ 43211) = 10601
⇒ (?) =10601 + 65942
⇒ (?) = 76543
Hence, Option (b) is correct.

22. Find the missing number
0.088/(?) = 0.02
(a) 4.2 (b) 3.4
(c) 4.4 (d) 3.2

Ans. (c): $\frac{0.088}{?} = 0.02$

$? = \frac{0.088}{0.02}$

Hence, $\boxed{? = 4.4}$

23. Pipes A and B can fill a tank in 15 and 10 hours respectively. Pipe C can empty it in 40 hours. If all the three pipes are opened together, then the tank would be filled in.
(a) 53/180 hours (b) 180/53 hours
(c) 120/17 hours (d) 17/120 hours

Ans. (c): Part filled by A in 1 hour = $\frac{1}{15}$

Part filled by B in 1 hour = $\frac{1}{10}$

Part emptied by C in 1 hour = $-\frac{1}{40}$

Net part filled in 1 hour = $\frac{1}{15}+\frac{1}{10}-\frac{1}{40}$

$= \frac{8+12-3}{120}$

$= \frac{17}{120}$

Hence, the tank will be full in $\frac{120}{17}$ hours.

24. The sum of ages of 4 children born at the intervals of 2 years each is 28 years. What is the age of the youngest child?
(a) 2 years (b) 3 years
(c) 5 years (d) 4 years

Ans. (d): Let the age of youngest child is x year.
According to the question,
x + x + 2 + x + 4 + x + 6 = 28
⇒ 4x+12 = 28
⇒ 4x = 16
⇒ x = 4
Hence, the age of youngest child is 4 years

25. The square root of $(10+\sqrt{25})(12-\sqrt{49})$ is
(a) $4\sqrt{3}$ (b) $3\sqrt{3}$
(c) $5\sqrt{3}$ (d) $2\sqrt{3}$

Ans. (c): $\sqrt{(10+\sqrt{25})(12-\sqrt{49})}$
⇒ $\sqrt{(10+5)(12-7)}$
⇒ $\sqrt{(15\times5)}$
⇒ $\sqrt{75}$
⇒ $5\sqrt{3}$
Hence, option (c) is correct.

26. Find the lowest common multiple of 42, 64 and 80.
(a) 5720 (b) 6720
(c) 6270 (d) 5270

Ans. (b): LCM of 42,64 and 80
= 2×2×2×2×2×2×5×3×7
= 6720

27. The value of (0. 12 × 0.12 × 0.12) × (1.32 × 1.32 × 1.32)/ (0.52 × 0.52) is.
(a) 0.0147 (b) 0.147
(c) 0.187 (d) 0.0187

Ans. (a): The given expression is -

$$\frac{(0.12\times0.12\times0.12)\times(1.32\times1.32\times1.32)}{(0.52\times0.52)}$$

$$\Rightarrow \frac{(12\times12\times12)\times(132\times132\times132)}{(52\times52)\times10^8}$$

$$\Rightarrow \frac{(3\times3\times12)\times(132\times132\times132)}{(13\times13)\times10^8}$$

⇒ 0.0147
Hence, option (a) is correct.

28. What is the total surface area of a right circular cone of height 12 cm and base radius 8 cm?
(a) 536.5 cm^2 (b) 436.5 cm^2
(c) 563.5 cm^2 (d) 463.5 cm^2

Ans. (c): we have,
r = 8cm and h = 12cm
Lateral height $l = \sqrt{h^2+r^2}$
$= \sqrt{(12)^2+(8)^2}$
$= \sqrt{144+64}$
= 14.42
∴ Total surface area = πr (l+ r)
= 3.14×8 (14.42+8)
≈ 563.5 cm^2

29. How many bricks, each measuring 10 cm × 8 cm × 4 cm, will be needed to build a wall of 1.6 m × 1.0 m × 20 cm?
(a) 4,000 (b) 6,000
(c) 8,000 (d) 1,000

Ans. (d): Given -
Dimension of wall
l = 1.6m = 160cm
b = 1.0m = 100cm
h = 20 cm
Volume of the wall = l × b × h = 160×100×20
= 320000 cm^3

Volume of brick = $10\times8\times4 = 320cm^3$

$\therefore$ Number of bricks = $\frac{\text{Volumes of wall}}{\text{Volume of 1 brick}}$

$= \frac{320000}{320} = 1000$

30. – 7 (2x + 4y) – 2 (x – 2y) is equal to.

(a) – 3 (2x + 3y) (b) – 4 (2x + 3y)
(c) – 8 (2x + 3y) (d) – 8 (2x – 3y)

Ans. (c): – 7 (2x + 4y) – 2 (x – 2y)
$\Rightarrow$ –14x – 28y –2x + 4y
$\Rightarrow$ –16x – 24y
$\Rightarrow$ – 8(2x + 3y)
Hence, option (c) is correct

31. If x = 15, y = 20 and z = 10 then (5x – 15)/(y + z) is equal to.

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

Ans. (b): Given x = 15, y = 20 and z = 10

$\frac{5x-15}{y+z} = \frac{5\times15-15}{20+10}$

$= \frac{75-15}{30}$

$= \frac{60}{30}$

$= 2$

32. In a rectangle, if the length is increased by 80% and the breadth is increased by 20%, then its area is increased by.

(a) 60% (b) 120%
(c) 116% (d) 156%

Ans. (c): If length and breadth increased by 80% and 20% respectively

% Area increased $= 80+20+\frac{80\times20}{100}$

$= 100+16 = 116\%$

33. Considering 0° < X < 180°, angle of cos x = 0.5877852 is.

(a) 126° (b) 54°
(c) 148° (d) 30°

Ans. (b): Given ,
cosx = 0.5877852 $0°< x < 180°$
(a) cos126° = cos (90+36) = –sin 36°(not equal to cosx)
(b) cos 54° = 0.5877852 (correct)
(c) cos 148° = cos(90+58°) = –sin 58(not equal to cosx)
(d) $\cos30° = \frac{\sqrt{3}}{2} = \frac{1.732}{2} = 0.87$ (not equal to cosx)
Hence option (b) is correct.

34. If the mean of x + 45, x – 32, x + 25, x + 13 and x – 21 is 12, then what is the mean of the last three observations?

(a) 14.67 (b) 12.67
(c) 11.67 (d) 15.67

Ans. (c) : According to the question ,

$\frac{x+45+x-32+x+25+x+13+x-21}{5} = 12$

$\Rightarrow 5x+30 = 60$
$\Rightarrow 5x = 30$
$\Rightarrow x = 6$
$\therefore$ mean of the last three observations

$= \frac{x+25+x+13+x-21}{3}$

$= \frac{3x+17}{3} = \frac{3\times6+17}{3}$

$= \frac{35}{3} = 11.67$

35. The value of $\frac{\sqrt{121}\times\sqrt{196}}{\sqrt{49}}$ is.

(a) 11 (b) 33
(c) 44 (d) 22

Ans. (d): Given-

$\frac{\sqrt{121}\times\sqrt{196}}{\sqrt{49}}$

$\Rightarrow \frac{11\times14}{7}$

$\Rightarrow 22$

Hence, option (d) is correct

36. 594 mm × 841 mm are the dimensions of_____size paper.

(a) A1 (b) A3
(c) A2 (d) A0

Ans. (a): 594 mm × 841 mm is the size of A1 Paper, other paper size are as follows–
A0 = 841 mm×1189
A2 = 594 mm × 420
A4 = 210 mm × 297
A5 = 148 mm × 210

37. In an isometric drawing, the object's vertical lines are drawn vertically, and the horizontal lines in the width and depth planes are shown at_____to the horizontal.

(a) 45 degrees (b) 60 degrees
(c) 30 degrees (d) 90 degrees

Ans. (c): In an isometric drawing, the object's vertical are drawn vertically while the horizontal lines in the width and depth planes are shown at 30º to the horizontal. These angles play a significant part in making three dimension structures i.e. cubes.

38. _____refers to the spacing between the characters of a font.

(a) Kerning (b) Tracking
(c) Gradient (d) Tessellation

Ans. (a): Kerning refers to the way spacing between two specific characters is adjusted.

39. _____Curve is a compound curve consists of two curves that are joined at a point of tangency and are located on the same side of a common tangent.

(a) Dupont (b) Bullnose
(c) Bevel (d) Ogee

Ans. (d): Ogee curve is a compound curve consists of two curves that are joined at a point of tangency and are located on the same side of a common tangent.

40. _____circle is the apparent circle that the two gears can be taken like smooth cylinders rolling without friction.

(a) Acme (b) Pitch
(c) Bevel (d) Bore

Ans. (b): Pitch circle is the apparent circle that the two gears can be taken like smooth cylinders rolling without friction.

41. Which of the following is a base unit?

(a) Candela (b) Radian
(c) Hertz (d) Ohm

Ans. (a): Base unit are the set of fundamental units in a system of measurement that is based on a natural phenomenon or established standards and from which other units may be derived. The base units of the international system of units are the meter, kilogram second, ampere, Kelvin, mole and candela.

42. Katal is the unit of_____.

(a) capacitance (b) stress
(c) catalytic activity (d) entropy

Ans. (c): Katal is the unit of catalytic activity in the International system of units for quantifying the catalytic activity of enzymes and other catalysts.

43. The gravitational acceleration is_____m/s^2 at the equator.

(a) 9.83 (b) 9.78
(c) 9.72 (d) 9.87

Ans. (b): The value of gravitational acceleration is different at the poles and at the equator. At the poles, It is about $9.83 m/s^2$ and at the equator $9.78 m/s^2$. It is less at equator due to the bulge present at the equator which affects the centripetal force.

44. Find mass of a gold biscuit of dimensions 5 cm × 3 cm × 0.5 cm. (Density of gold 19 gm/cm^3)

(a) 122.5g (b) 152.5g
(c) 142.5g (d) 162.5g

Ans. (c): Volume of gold biscuit = 5 × 3 × 0.5 = 7.5 cm^3
Mass = Volume × density
= 7.5 × 19 = 142.5gm

45. What is the relative density of a solid of mass 75 gm which when fully immersed in water weighs 25 gm?

(a) 2.5 (b) 0.8
(c) 1.6 (d) 1.5

Ans. (d): Mass of solid = 75 gm
Weight of solid when fully immersed in water = 25 gm
Amount of water removed by water (75-25) = 50 gm

$$\text{Relative density} = \frac{\text{Mass of solid}}{\text{Amount of water displaced by solid}}$$

$$= \frac{75}{50} = \frac{3}{2} = 1.5$$

46. Find the length of the edge of a metal cube of density 8 g/cm^3 which weight 17.28 KN. (Use g = 10 m/s^2)

(a) 8 cm (b) 6 cm
(c) 10 cm (d) 9 cm

Ans. (b): Given,
Density of metal = 8 g/cm^3
Weight = 17.28 KN
= 17.28 ×10^3N
Let the length of edge = a cm
Volume of edge = a^3 cm^3
Weight = 17.28×10^3 N
m×g = 17.28×10^3

$$m = \frac{17.28\times10^3}{10}$$

$m = 1.728\times10^3$

$$\text{Volume} = \frac{\text{Mass}}{\text{Density}} = \frac{1.728\times10^3}{8}$$

Volume = 0.216×10^3
$a^3 = 216$ cm^3
a = 6cm

47. Acceleration due to gravity on Mars is 1/3rd that on earth. How much would an astronaut weight on Mars if he weighs 72 kg on earth? (acceleration due to gravity on earth = 10 m/s^2)

(a) 240N (b) 720N
(c) 360N (d) 120N

Ans. (a): Weight on earth (W_e) = 72 kg
Gravity on earth (g) = 10 m/s^2
Gravity on mars = g/3

$$= \frac{10}{3}\ m/s^2$$

$$\text{Weight on mars } (W_m) = \text{mass} \times \frac{g}{3} = 72\times\frac{10}{3}$$

Weight on mars (in Newton) = 24×10 = 240 N

48. If the speed of a car increases from 64 km/hr to 120 km/hr to its kinetic energy would increase in the ratio_____.

(a) 15/8 (b) 25/16
(c) 125/32 (d) 225/64

Ans. (d): v_1 = 64 km/hr.
v_2 = 120 km/hr.
Mass is same (m)
$K_1 = ½mv_1^2$
$= ½m(64)^2 = 4096$ m Joule
$K_2 = ½ mv_2^2$
$= ½ m(120)^2 = 14{,}400$ m Joule

$$\text{Required ratio} = \frac{14400\,m}{4096\,m} = \frac{1800}{512} = \frac{225}{64}$$

49. Find the work done if a force of 1200 N pushes a trolley of mass 45 kg by 30 m.

(a) 54 kJ (b) 42 kJ (c) 24 kJ (d) 36 kJ

Ans. (d): Given that–
Force (F) = 1200N
Mass (m) = 45kg
Displacement (S) = 30 m
work done force × Displacement
W = F × S
W = 1200N × 30m
W = 36000Nm
W = 36000J
W = 36 KJ (1KJ = 1000J)

50. A train of mass 50,000 kg accelerates from 5 m/s to 25 m/s. Find the change in its kinetic energy.

(a) 25 MJ (b) 12.5 MJ
(c) 17.5 MJ (d) 15 MJ

Ans. (d): From, kinetic energy $= \frac{1}{2}mv^2$

According to the question,

Change in kinetic energy of train

$$= \frac{1}{2} \times 50000\left\{(25)^2 - (5)^2\right\}$$

$$= \frac{1}{2} \times 50000 \times 600$$

$= 15 \times 10^6$ Joule

= 15 Mega Joule

51. Find the power of a pump if it can lift 750 litres of water by 150 m in 25 minutes. (Assume 75% efficiency and use g = 10 m/s^2 and density of water as 1g/cm^3)

(a) 1.2 kW (b) 1 kW
(c) 1.5 kW (d) 2 kW

Ans. (b): Power of pump $= \frac{\text{Total work done}}{\text{Time} \times \text{efficiency}}$

According to the question,

Power of pump $= \frac{1 \times 750 \times 10 \times 150}{25 \times 60} \times \frac{100}{75}$

=1000 Joule/second

=1 kilowatt

52. X and Y start to cycle from point P towards point Q. The distance between P and Q is 10 km. Y starts 8 minutes after X. X on reaching Q immediately returns and after cycling for 2 km meets Y. If X's speed be a kilometer in 6 minutes, what is Y's speed in kilometers per minute?

(a) 1/10 (b) 1/6
(c) 1/8 (d) 1/15

Ans. (c):

P——————Q
←——10km——→

According to the question,

Distance covered by X to meet Y = 10 + 2 = 12 km

And distance covered by Y = 8km

Time taken to cycling 12 km by X = 12 × 6 = 72 minutes

Then time taken by Y to cycling 8 km = 72 – 8 = 64 minutes

Hence, the speed of Y (in km/min)

$$= \frac{8}{64} = \frac{1}{8}\text{km/min}$$

53. Two trains, X and Y, travel from A to B at average speeds of 80 km/hr and 90 km/hr respectively. If X takes an hour more than Y for the journey, then the distance between A and B is_____.

(a) 360 km (b) 720 km
(c) 540 km (d) 630 km

Ans. (b): Let distance be x km.

According to the question ,

$$\frac{x}{80} - \frac{x}{90} = 1$$

$$\Rightarrow \quad \frac{9x - 8x}{720} = 1$$

$$\Rightarrow \quad x = 720\text{km}$$

Hence, required distance = 720km.

54. A rocket travels 108 m in 0.3 seconds. Find its speed in km/hr.

(a) 1296 km/hr (b) 3600 km/hr
(c) 1692 km/hr (d) 6300 km/hr

Ans. (a): According to the question ,

$$\therefore \text{ Speed} = \left(\frac{108}{0.3} \times \frac{18}{5}\right)\text{km/hr} = 1296\text{km/hr}$$

55. Find the heat capacity of a pan of mass 180 g, if its temperature rises by 50 degree on receiving 2400 J of heat.

(a) 48 JK^{-1} (b) 13.33 jkg^{-1} K^{-1}
(c) 36 JK^{-1} (d) 16.67 jkg^{-1} K^{-1}

Ans. (a): Mass (m) = 180 g = 0.18 kg

Q = 2400 J

difference in temperature (ΔT) = 50°C/Kelvin

$$\text{Heat capacity} = \frac{\text{Heat energy supplied}}{\text{Rise in temperature}}$$

$$= \frac{2400\text{J}}{50\text{K}} = 48\text{JK}^{-1}$$

56. Find the specific heat capacity of a block of metal of mass 300 g, the temperature of which rises by 50 degrees when it absorbs 12 kJ of heat?

(a) 1.25 Jg^{-1}K^{-1} (b) 0.5 Jg^{-1}K^{-1}
(c) 2.5 Jg^{-1}K^{-1} (d) 0.8 Jg^{-1}K^{-1}

Ans. (d): m = 300 gm

ΔT = 50°C

Q = 12 KJ

= 12000J

Specific heat capacity (s) = ?

Q = m.s. ΔT

$$s = \frac{Q}{m.\Delta T} = \frac{12000}{50 \times 300} = \frac{12}{5 \times 3} = \frac{4}{5}$$

= 0.8 J g^{-1}K^{-1}

57. Find the specific latent heat of vapourisation of 4.5 gm of nitrogen, if it relases 990 joules of heat when it condenses at its boiling point of – 196°C.

(a) 200 J/g (b) 180 J/g
(c) 160 J/g (d) 220 J/g

Ans. (d): Given,

Mass (m) = 4.5 gm

Heat (Q) = 990 Joul

If the latent heat of the substance is L, then heat required to change the state of mass m of the substance is

Q = mL

990 = 4.5 × L

$$L = \frac{990}{4.5}$$

L = 220 Joul/gm

58. – 150° Celsius = ____ Fahrenheit

(a) – 212° (b) – 418°
(c) – 373° (d) – 238°

Ans. (d): Formula to convert from Celsius to Fahrenheit
°F = °C×9/5 +32
= –150×9/5 +32
= –238
Hence, the option (d) is the correct option.

59. If one and a half litres of hot water at 80°C is mixed with two and a half a litres of colder water at 40°C, find the final equilibrium temperature if no heat is lost.

(a) 50°C (b) 65°C
(c) 55°C (d) 60°C

Ans. (c):
Let the final equilibrium temperature = T°C
We know that, specific heat capacity of water = 4200 $Jkg^{-1}°C^{-1}$
Then,
Heat released by Hot water = 1.5 × 4200 (80 – T)
Heat gained by cold water = 2.5 × 4200 (T – 40)
From principle of calarimetry
Lost heat = gained heat
1.5 × 4200 (80 – T) = 2.5 × 4200 (T – 40)
120 – 1.5T = 2.5T – 100
4T = 220
T = 55°C

60. A wire is stretched to 4 times its original length. The resistance of the streched wire will be_____its original resistance.

(a) double (b) half
(c) 16 times (d) $1/16^{th}$

Ans. (c): Let Resistance, Length, and cross section area of wire be R, *l* and A respectively.

We have $R = \rho\frac{l}{A}$ _____(i)

On stretching the wire 4 times, $l^1 = 4l$

and$A_1 = \frac{A}{4}$

then its resistance be, $R_1 = \rho\frac{4l}{\frac{A}{4}}$

$$R_1 = 16\rho\frac{l}{A}$$

R_1 = 16R (From (1)

Hence, the resistance of the stretched wire will be 16 times its original resistance.

61. Two resistors of RΩ and 6Ω are connected in parallel to get an effective resistance of 4.5 Ω. Find R.

(a) 12 (b) 18
(c) 24 (d) 30

Ans. (b): On connected the resistances in parallel–

$$\frac{1}{R}+\frac{1}{6}=\frac{1}{4.5}$$

$$\frac{1}{R}=\frac{1}{4.5}-\frac{1}{6}$$

$$\frac{1}{R}=\frac{0.5}{9}$$

$$\frac{1}{R}=\frac{1}{18}$$

R = 18

62. If 625 J of work is done in moving a charge of Q coulombs across 12.5 V, find Q.

(a) 40 (b) 25
(c) 20 (d) 50

Ans. (d): Given,
Work done W = 625 J
Potential difference V = 12.5 v
The amount of Charge Q = ?

We have $V = \frac{W}{Q}$

or $Q = \frac{W}{V}$

$$Q = \frac{625}{12.5} = 50C$$

63. Which of the following is the correct relation between potential difference 'V', current 'I' conductivity 'σ', length 'L' and area of cross section 'A' of a metal wire?

(a) VA = ILσ (b) σ = VL/IA
(c) VL = IAσ (d) VσA = IL

Ans. (d): We know that–

$$R = \rho\left(\frac{L}{A}\right)$$

And, V = IR

$$R = \frac{V}{I}$$

$$\frac{V}{I} = \rho\left(\frac{L}{A}\right)$$

VA = ρ LI

Conductivity (σ) = $\frac{1}{\text{Resistivity}(\rho)}$

$$\sigma = \frac{LI}{AV} \Rightarrow AV\sigma = LI$$

64. Find the potential difference across a resistance of 3.6 kΩ through which a 2.5 mA current flows.

(a) 1.44V (b) 8V
(c) 9V (d) 0.3V

Ans. (c): Given,

Current I = 2.5 mA $= 2.5\times\frac{1}{1000}A = 0.0025A$

Resistance R = 3.6 kΩ = 3.6 × 1000 Ω = 3600 Ω
We know that
V = IR
V = 0.0025 × 3600
v = 9V

65. Which of the following is an example of a first class lever?

(a) wheel barrow (b) pliers
(c) nut crackers (d) ice tongs

Ans. (b): Pliers, Scissors, a crow bar, a claw hammer and a weighing balance are the examples of first class lever. Wheel barrow and nut cracker are the examples of second class lever whereas ice tongs is an examples of third class lever.

66. In a certain gear train, the driver has 32 teeth while the follower has 20 teeth. For every, 25 turns of the driver the follower turns____times.

(a) 20 (b) 40
(c) 30 (d) 50

Ans. (b): Number of teeth of driver gear (T_1) = 32
Number of teeth of follower gear (T_2) = 20

$$\text{Gear ratio} = \frac{D_1}{D_2} = \frac{T_1}{T_2} = \frac{N_2}{N_1}$$

$$= \frac{32}{20} = \frac{N_2}{25}$$

$$N_2 = 40$$

Where, N_1 – Driving gear speed
N_2 – Follower speed
D_1 – Diameter of the driving gear
D_2 –Diameter of follwer

67. Find the efficiency of a pulley system which has a Mechanical advantage of 3.6 and where the load lifts by 1.6 meters on pulling the rope by 8 m.

(a) 64% (b) 72%
(c) 81% (d) 90%

Ans. (b): Given that:
Mechanical advantage

$$\text{Velocity Ratio (VR)} = \frac{\text{Distance covered by the effort}}{\text{Distance covered by the weight}}$$

$$\text{VR} = \frac{8\,\text{m}}{1.6\,\text{m}} = 5\ \text{m}$$

Now the efficiency of the pulley system

$$= \frac{\text{Mechanical advantage}}{\text{Velocity ratio}} \times 100$$

$$= \frac{3.6}{5} \times 100 = 72\%$$

68. Two children of 24 kg and 16 kg sit on one side of a see-saw at a distance of 1 m and 0.625 m respectively, from the fulcrum. If a body of 'm' kg sits on the other side of the see-saw at a distance of 1.6 m from the fulcrum and the see-saw is in equilibrium. Find m.

(a) 21.25 kg (b) 36.75 kg
(c) 32.25 kg (d) 27.75 kg

Ans. (a): Since the children of 24kg and 16 kg sit on the one side of fulcrum and the child having mass **m** is sitting on the other side of the fulcrum.
Hence in the state of equilibrium.

$(24\times1) + (16\times0.625) = m\times1.6$
$24 + 10 = m \times 1.6$

$$m = \frac{34}{1.6}$$

$m = 21.25$ kg

Hence the weight of the child sitting on the other side will be 21.25 kg.

69. Vitamin B1 is also known as_____.

(a) Riboflavin (b) Ascorbic acid
(c) Thiamine (d) Niacin

Ans. (c): Vitamin B_1 is also known as Thiamine.
Name of other vitamins are
Vitamin A - Retinol
Vitamin B_2 - Riboflavine
Vitamin B_3 - Niacin
Vitamin B_5 - Pantothenic Acid
Vitamin B_6 - Pyridoxine
Vitamin B_7 - Biotin
Vitamin B_9 - Folic acid
Vitamin B_{12} - Cobalamin
Vitamin C - Ascorbic acid
Vitamin D - Calciferol
Vitamin E - Tocopherol
Lack of vitamin B_1 causes - diseases Beriberi.

70. _____radiation has limited penetration ability and is usually stopped by clothing.

(a) Beta (b) Alpha
(c) Gamma (d) Neutron

Ans. (b): Alpha rays have limited penetration ability and maximum ionisation strength, they cannot cross even clothes.
Beta rays are extremely energetic electrons. Gamma rays have the most penetrating power because they carries a large amount of energy.
They can travel via thick concrete lead.
α (alpha) rays are positively charged particles, β(Beta) rays are negatively charged, and γ (Gama) rays are neutral.

71. ____is a penicillin antibiotic that fights bacteria.

(a) Ibuprofen (b) Amoxicillin
(c) Clonazepam (d) Atorvastatin

Ans. (b): Amoxicillin is a penicillin antibiotic that fight against bacteria, other antibiotics are cefuroxime, cefixime, ofloxacin etc.
Ibuprofen is a pain killer. Clonazepam is a medicine for anxiety and panic disorders and Atorvastatin of cardiovascular disease.

72. Which of the following gases is a colourless, flammable, and highly toxic gas?

(a) Carbon dioxide (b) Arsine
(c) Methane (d) Nitrogen dioxide

Ans. (b): Arsine is a colourless, flammable, and highly toxic gas. It is used as a chemical weapon agent, despite its lethality it finds some applications in the semiconductor industry.

73. A_____is defined as something that can directly cause cancer. This can be a chemical substance, a virus, or radiation.

(a) Carcinogen (b) Cankerous
(c) Detritus (d) Cardiogen

Ans. (a): Carcinogen is a substance that can cause cancer be it virus, chemical substances or radiation.
Detritus is a loose material after disintegration, It is Natural waste material left after something has been used or broken up into small parts.

74. **_____is the general term covering all the different types of threats to your computer safety such as viruses, spyware, worms, trojans, rootkits and so on.**
(a) Clickbait (b) Encryption
(c) Malware (d) Spam

Ans. (c): Malware is a general term for computer safety threats comprising virus, spyware, worms trojans etc.
Spam is any kind of unwanted, unsolicited digital communication that is sent out in bulk.

75. **The_____process loads the operating system into main memory or the random access memory (RAM) installed on your computer.**
(a) format (b) index
(c) boot (d) map

Ans. (c): Booting is a process of starting a computer. It can be initiated by hardware such as button press or by a software command. It is a process of loading an operating system into the computer's main memory or Random Access Memory (RAM).
Format is the shape of something or the way it is arranged or produced.

76. **Select the related word from the given alternatives.**
Engine : Train : : Needle: ?
(a) Pin (b) Steel
(c) Cloth (d) Thread

Ans. (d): Just as engine is related to train similarly needle is related to thread.

77. **Select the related word from the given alternatives.**
Verse : Stanza : : Sentences: ?
(a) Paragraph (b) Book
(c) Poem (d) Author

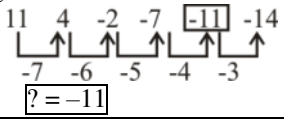
Ans. (a): Just as , stanza is made from each Verse, similarly a paragraph is made from each sentence.

78. **In the following question, which one set of letters when sequentially placed at the gaps in the given letter series shall complete it?**
ab__ab8__a7b__6da5__c4de__
(a) 9ccb3 (b) 9cab3
(c) c9a3b (d) c9b3a

Ans. (a): The given series is as follows-
ab9/ab8/ca7/bc6/da5/bc4/de3
Hence, option (a) is correct

79. **Find the missing number in the given series.**
11, 4, – 2, – 7, ?, – 14
(a) – 11 (b) – 10
(c) – 12 (d) – 9

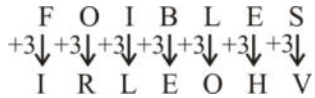
Ans. (a): The given series is as follows-



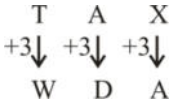
Hence, ? = –11

80. **If FOIBLES is coded as IRLEOHV, then how will TAX be coded as?**
(a) GZC (b) SZW
(c) UBY (d) WDA

Ans. (d): Just as,



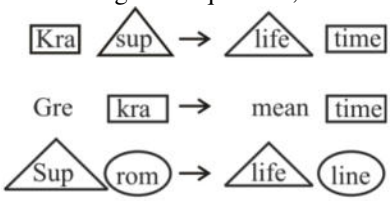
Similarly,



Hence, TAX = WDA

81. **Here are some words from an artificial language.**
krasup means lifetime
grekra means meantime
suprom means lifeline
Which word wouldmean 'coastline'?
(a) romstu (b) malkra
(c) vuzsup (d) greloz

Ans. (a): According to the question,



From option (a),
So, Romstu would mean 'Coastline'.

82. **In a certain code language, '+', represents, '×', '÷' represents '+', '–' represents '÷' and '×' represents, '–'. Find out the answer to the following questions.**
9 + 8 – 18 ÷ 10 × 2 = ?
(a) 12 (b) 4
(c) 19 (d) 13

Ans. (a): Given,
$+ \rightarrow \times$
$\div \rightarrow +$
$- \rightarrow \div$
$\times \rightarrow -$
$9 + 8 - 18 \div 10 \times 2$
On changing the symbols-
$9 \times 8 \div 18 + 10 - 2$
$\Rightarrow 9 \times \frac{8}{18} + 10 - 2$
$\Rightarrow 4 + 10 - 2$
$\Rightarrow 14 - 2$
$\Rightarrow 12$
Hence, option (a) is correct.

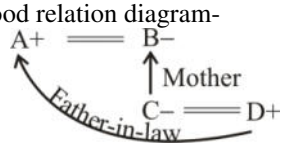
83. **If 5#1 = 20; 11#4 = 35; 9#3 = 30; Then find the value of 10#7 = ?**
(a) 17 (b) 3
(c) 6 (d) 15

Ans. (d): Just as ,
$5\#1 = 5 - 1 = 4 \times 5 = 20$
$11\#4 = 11 - 4 = 7 \times 5 = 35$
$9\#3 = 9 - 3 = 6 \times 5 = 30$
Similarly,
$10\#7 = 10 - 7 = 3 \times 5 = \boxed{15}$
Hence, option (d) is correct.

84. **If P $ Q means P is the husband of Q; P ! Q means P is the mother Q and P * Q means P is the wife of Q, which of the following shows that A is father-in-law of D?**

(a) A ! B $ C * D (b) A $ B * C ! D
(c) A ! B * C $ D (d) A $ B ! C * D

Ans. (d): From option (d)
A $ B ! C * D
On making blood relation diagram-

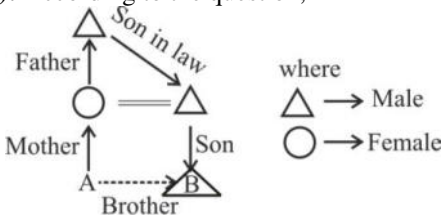


So, A is father-in-law of D
Hence option (d) is correct.

85. **A said to B, ''You are my mother's father's son-in-laws' son.'' How is B related to A, if B's mother has no siblings?**

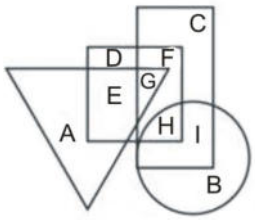
(a) B is the son of A
(b) B is the father of A
(c) B is the brother of A
(d) B is the grand-father of A

Ans. (c): According to the question,



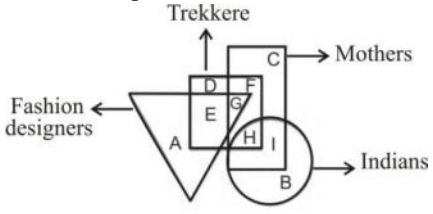
Hence it is clear from above diagram that B is the brother of A.

86. **In the following figure, the triangle represents fashion designers, the square represents trekkers, the circle represents Indians and the rectangle represents mothers. Which set of letters represents mothers who are either trekkers or Indians?**



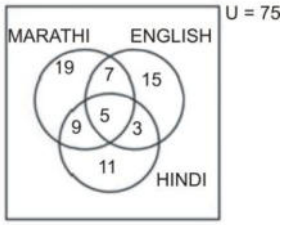
(a) EGF (b) FGHI
(c) HIC (d) CIDE

Ans. (b): From the question,



Hence, it is clear from diagram that 'FGHI' represents mothers who are either trekkers or Indians.

87. **The given Venn diagram shows the number of students who have passed in the three language tests, viz. English, Hindi and Marathi. How many students failed in any one language test?**



(a) 24 (b) 24
(c) 6 (d) 19

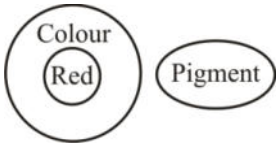
Ans. (d): Number of student failed in all tests
75–(19+7+15+9+5+3+11) = 6
Number of students failed in Marathi
= 75-(19+7+9+5) = 35
Numbers of students failed in Marathi only
= 35–(11+15+6) =3
Number students failed in English
= 75–(7+15+5+3) = 45
Number of students failed in English only
= 45–(19+11+6) = 9
Number of students failed in Hindi
=75–(9+5+3+11) = 47
Number of students failed in Hindi only
= 47–(19+15+6) = 7
Hence, number of students failed in any one test = 3+9+7 = 19

88. **In the question two statements are given, followed by two conclusions, I and II. You have to consider the statements to be true even if it seems to be at variance from commonly known facts. You have to decide which of the given conclusions, if any, follows from the given statements.**

Statement 1 : All Red is Colour.
Statement 2 : No Colour is Pigment.
Conclusion I : No Red is Pigment.
Conclusion II : Some Colour is Red.

(a) Only conclusion I follows
(b) Only conclusion II follows
(c) Both I and II follow
(d) Neither I nor II follows

Ans. (c): According to the statement, Venn diagram is as follows-



Conclusion:
I - ✓
II - ✓
Hence, it is clear from the above Venn diagram that both conclusion I and II follows.