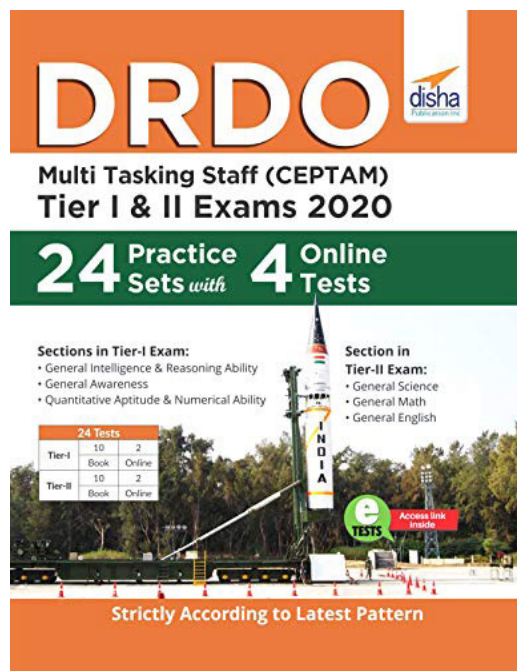


Practice Set for DRDO MTS Tier-2 Exam

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PRACTICE SET-1

GENERAL SCIENCE

- Electric current is measured using which of the following instrument ?
(a) Voltmeter (b) Anemometer
(c) Wattmeter (d) Ammeter
- Match the following :

I				II			
A.	Ascorbic acid	1.	Photosynthetic pigment				
B.	Chlorophyll	2.	Quencher				
C.	Carotenoid	3.	Enzyme				
D.	Superoxide dismutase	4.	Vitamin-C				

	A	B	C	D
(a)	4	2	1	3
(b)	2	4	1	3
(c)	4	1	3	2
(d)	4	1	2	3
- Outside the nucleus DNA is found in
(a) Mitochondria
(b) Ribosome
(c) Endoplasmic reticulum
(d) Golgi bodies
- It is easy to burst a gas filled balloon with a needle than with a nail. It is because
(a) nail exerts more pressure than needle on the balloon
(b) needle exerts more pressure than nail on the balloon
(c) gas is reactive with the needle
(d) nail is more longer than needle
- The velocity of sound in moist air is more than in dry air because the moist air has
(a) less pressure than dry air
(b) more pressure than dry air
(c) more density than dry air
(d) less density than dry air
- Ice is packed in saw dust because
(a) saw dust is poor conductor of heat.
(b) saw dust is a good conductor of heat.
(c) saw dust does not stick to the ice.
(d) saw dust will not get melted easily.
- What happens when a drop of glycerol is added to crushed KMnO_4 spread of a paper ?
(a) There is a violent explosion
(b) There is no reaction
(c) The paper ignites
(d) There is a crackling sound.
- Hydrogen peroxide is an effective sterilizing agent. Which one of the following product results when it readily loses active oxygen ?
(a) Water (b) Hydrogen
(c) Ozone (d) Nasant Hydrogen
- The term 'brown air' is used for
(a) Photochemical smog (b) Sulfurous smog
(c) Industrial smog (d) Acid fumes
- Which of the following particles has the dual nature of particle-wave ?
(a) Neutron (b) Electron
(c) Meson² (d) Proton
- Burns caused by steam are much more severe than those caused by boiling water because:
(a) Steam pierces through the pores of body quickly
(b) Temperature of steam is higher
(c) Steam is gas and engulfs the body quickly
(d) Steam has latent heat
- Microbial degradation of nitrates into atmospheric nitrogen is known as :
(a) Ammonification (b) Denitrification
(c) Putrefaction (d) Nitrification
- Muddy water is treated with alum in purification process, it is termed as :
(a) absorption (b) adsorption
(c) coagulation (d) emulsification
- An enzyme produced by HIV that allows the integration of HIV DNA into the host cell's DNA is:
(a) DNA gyrase (b) Ligase
(c) Integrase (d) Helicase
- The antibiotic penicillin is obtained from which of the following ?
(a) synthetic process (b) a bacterium
(c) fungus (d) virus infected cells
- Which cell disorder in our body is responsible for colour blindness?
(a) WBC (b) Cone cell
(c) Rod Cell (d) Neuron
- A particle is thrown vertically upward. When it reaches the highest point, it has _____.
(a) a downward acceleration
(b) an upward acceleration
(c) a downward velocity
(d) a horizontal velocity

18. During fermentation of sugar, the compound which is always formed is
(a) Methyl Alcohol (b) Ethyl Alcohol
(c) Acetic Acid (d) Ethylene
19. The quality or tone of a musical sound produced by a stringed instrument depends on
(a) frequency of vibration
(b) length of the strings in the instrument
(c) Amplitude of vibration
(d) waveform of the sound
20. Removal of carbon particles from air involves the principle of
(a) Precipitation (b) Filtration
(c) Electrophoresis (d) Sedimentation
21. Which of the following acts as best adsorbent?
(a) Charcoal
(b) Activated Charcoal
(c) Activated Coconut Charcoal
(d) Carbon black
22. Which one of the following substances is normally found in urine?
(a) Blood proteins (b) Creatinine
(c) Red blood cells (d) White blood cells
23. Which vitamins are those, if taken in excess can be dangerous as they are stored in the body?
(a) B Complex (b) E and C
(c) B and C (d) A and D
24. The phenomenon of change in direction of light when it passes from one medium to another is called
(a) Propagation (b) Reflection
(c) Refraction (d) Dispersion
25. The chemical component that is invariably found in all viruses is
(a) proteins (b) lipids
(c) DNA (d) RNA
26. Suspended colloidal particles in the water can be removed by the process of :
(a) Filtration (b) Adsorption
(c) Absorption (d) Coagulation
27. Grave's disease is caused due to:
(a) hyperactivity of thyroid
(b) hypoactivity of thymus
(c) hypoactivity of thyroid
(d) hyperactivity of thymus
28. A white solid 'A' on heating gives off a gas which turns lime water milky. The residue is yellow when hot but turns white on cooling. The solid A is:
(a) Zinc Carbonate (b) Lead Sulphate
(c) Lead Carbonate (d) Zinc Sulphate
29. Red light is used in traffic signal for stopping the traffic because:
(a) eye is more sensitive to red light.
(b) it is least scattered and hence can be easily noticed from long distance.
(c) it is very pleasant to the eye.
(d) it is visible even to longsighted people.
30. The nutritive tissue in the seeds of higher plants is known as
(a) nucellus (b) hypocotyl
(c) embryo (d) endosperm
31. The rate of change of velocity is called :
(a) Force (b) Momentum
(c) Acceleration (d) Speed
32. If a body is whirled in a circle the work done on it
(a) is negative
(b) is zero
(c) cannot be determined
(d) is positive
33. The motile germ cell is called a/an:
(a) Isogamete (b) Gamete
(c) Male gamete (d) Female gamete
34. Dwarfness can be controlled by treating plants will :
(a) Auxin (b) Cytokinin
(c) Gibberellic acid (d) Ethylene
35. Which one of the following is commonly used as an indicator to measure the exact pH ?
(a) Eosin (b) Universal indicator
(c) Litmus (d) Phenolphthalein
36. Aluminium oxide is in nature.
(a) acidic (b) basic
(c) neutral (d) amphoteric
37. Which of the following metals is a liquid at room temperature?
(a) Lithium (b) Calcium
(c) Mercury (d) Sodium
38. What is the atomicity of Phosphorus?
(a) Mono-atomic (b) Di-atomic
(c) Poly-atomic (d) Tetra-atomic
39. The egg is carried from the ovary to the womb through :
(a) the vas deferens (b) the oviduct
(c) the cervix (d) the uterus
40. Which of the following plant tissues is capable of cell division?
(a) Meristem (b) Sclerenchyma
(c) Xylem (d) Parenchyma

GENERAL MATH

41. The value of $\left(\frac{-1}{216}\right)^{-\frac{2}{3}}$ is :
(a) $\frac{1}{36}$ (b) $-\frac{1}{36}$
(c) -36 (d) 36
42. The unit's digit in the product $7^{35} \times 3^{71} \times 11^{55}$ is :
(a) 1 (b) 3
(c) 7 (d) 9
43. When the price of a radio was reduced by 20%, its sale increased by 80%. What was the net effect on the sale?
(a) 44% increase (b) 44% decrease
(c) 66% increase (d) 75% increase
44. How much water must be added to 48 ml of alcohol to make a solution that contains 25% alcohol ?
(a) 24ml (b) 72ml
(c) 144ml (d) 196ml

45. Ravi's salary is 150% of Amit's salary. Amit's salary is 80% of Ram's salary. What is the ratio of Ram's salary to Ravi's salary ?
 (a) 1 to 2 (b) 2 to 3
 (c) 5 to 6 (d) 6 to 5
46. A sum of money invested at compound interest amounts in 3 years to ₹ 2,400 and in 4 years to ₹ 2646. The interest rate per annum is :
 (a) 6% (b) 5%
 (c) 10% (d) 12%
47. A man borrows ₹ 6000 at 10% compound rate of interest. He pays back ₹ 2000 at the end of each year to clear his debt. The amount that he should pay to clear all his dues at the end of third year is
 (a) ₹ 6000 (b) ₹ 3366
 (c) ₹ 3060 (d) ₹ 3066
48. At what percentage above the cost price must an article be marked so as to gain 33% after allowing the customer a discount of 5% ?
 (a) 48% (b) 43%
 (c) 40% (d) 38%
49. The batting average of 40 innings of a cricket player is 50 runs. His highest score exceeds his lowest score by 172 runs. If these two innings are excluded, the average of the remaining 38 innings is 48. His highest score was :
 (a) 172 (b) 173
 (c) 174 (d) 176
50. The lengths of three sides of a triangle are known. In which of the cases given below, it is impossible to get a triangle ?
 (a) 15 cm, 12 cm, 10 cm (b) 3.6 cm, 4.3 cm, 5.7 cm
 (c) 17 cm, 12 cm, 6 cm (d) 2.3 cm, 4.4 cm, 6.8 cm
51. Which one of the following is a factor of $x^3 - 19x + 30$?
 (a) $x - 2$ (b) $x + 2$
 (c) $x - 1$ (d) $x + 1$
52. If $2x^2 - 7xy + 3y^2 = 0$, then the value of $x : y$ is :
 (a) 3 : 2 (b) 2 : 3
 (c) 3 : 1 or 1 : 2 (d) 5 : 6
53. If $27 \times (81)^{2n+3} - 3^m = 0$, then what is m equal to?
 (a) $2n + 5$ (b) $5n + 6$
 (c) $8n + 3$ (d) $8n + 15$
54. If $\tan A = -\frac{1}{2}$ and $\tan B = -\frac{1}{3}$, then $A + B =$
 (a) $\frac{\pi}{4}$ (b) $\frac{3\pi}{4}$
 (c) $\frac{5\pi}{4}$ (d) None of these
55. $\cos 1^\circ \cdot \cos 2^\circ \cdot \cos 3^\circ \dots \cos 179^\circ$ is equal to—
 (a) -1 (b) 0
 (c) 1 (d) $1/\sqrt{2}$

DIRECTIONS (Qs. 56-58): The following table, gives the annual production (in thousands) of 5 products of a famous toy company. Study the table and then answer the questions that follow :

Year	Ludo	Scrabble	Chess	Monopoly	Carrom
1992	200	150	78	90	65
1993	150	180	100	105	70
1994	180	175	92	110	85
1995	195	160	120	125	75
1996	220	185	130	135	80

56. What is the approximate percentage increase in the production of Monopoly form 1993 to 1995?
 (a) 10 (b) 20
 (c) 5 (d) 25
57. For which toy category there has been a continuous increase in the production over the years?
 (a) Ludo (b) Chess
 (c) Monopoly (d) Carrom
58. What is the percentage drop in the production of Ludo from 1992 to 1994 ?
 (a) 30 (b) 50
 (c) 20 (d) 10
59. A circle road runs around a circular garden. If the difference between the circumference of the outer circle and the inner circle is 44 m, the width of the road is
 (a) 4m (b) 7m
 (c) 3.5m (d) 7.5m
60. The perimeter of a square whose area is equal to that of a circle with perimeter $2\pi x$ is :
 (a) $2\pi x$ (b) $\sqrt{\pi x}$
 (c) $4x\sqrt{\pi}$ (d) $4\pi\sqrt{x}$
61. If the L.C.M and H.C.F. of two numbers are 2400 and 16, one number is 480; find the second number.
 (a) 40 (b) 80
 (c) 60 (d) 50
62. The average age of 80 boys in a class is 15. The average age of a group of 15 boys in the class is 16 and the average age of another 25 boys in the class is 14. What is the average age of the remaining boys in the class ?
 (a) 15.25 (b) 14
 (c) 14.75 (d) Cannot be determined
63. By selling a table for ₹ 330, a trader gains 10%. Find the cost price of the table.
 (a) 300 (b) 363
 (c) 297 (d) 270
64. If a dividend of ₹ 57,834 is to be divided among Meena, Urmila and Vaishali in the proportion of 3:2:1, find Urmila's share.
 (a) ₹ 19,281 (b) ₹ 17,350
 (c) ₹ 23,133 (d) ₹ 19,278
65. A certain number of men can do a work in 60 days. If there were 8 men more it could be finished in 10 days less. How many men are there ?
 (a) 75 men (b) 40 men
 (c) 48 men (d) 45 men
66. A cyclist covers a distance of 750 m in 2 min 30 sec. What is the speed in km/h of the cyclist ?
 (a) 18 km/h (b) 15 km/h
 (c) 20 km/h (d) None of these

67. A horse is tethered to one corner of a rectangular grassy field 40 m by 24 m with a rope 14 m long. Over how much area of the field can it graze?
(a) 154 cm² (b) 308 m²
(c) 150 m² (d) None of these
68. A dishonest dealer sells his goods at the cost price but still earns a profit of 25% by underweighing. What weight does he use for a kg?
(a) 750 g (b) 800 g
(c) 825 g (d) 850 g
69. A can do a piece of work in 9 days and B in 18 days. They begin together, but A goes away 3 days before the work is finished. The work lasts for
(a) 6 days (b) 8 days
(c) 12 days (d) 10 days
70. If a man walks to his office at $\frac{5}{4}$ of his usual rate, he reaches office 30 minutes early than usual. What is his usual time to reach office.
(a) 2 hr (b) $2\frac{1}{2}$ hr
(c) 1 hr 50 min (d) 2 hr 15 min
71. If the numbers $\sqrt[3]{9}$, $\sqrt[4]{20}$, $\sqrt[5]{25}$ are arranged in ascending order, then the right arrangement is
(a) $\sqrt[5]{25} < \sqrt[4]{20} < \sqrt[3]{9}$ (b) $\sqrt[3]{9} < \sqrt[4]{20} < \sqrt[5]{25}$
(c) $\sqrt[4]{20} < \sqrt[5]{25} < \sqrt[3]{9}$ (d) $\sqrt[5]{25} < \sqrt[3]{9} < \sqrt[4]{20}$
72. A bookseller makes 8% profit after selling the book at 10% discount. The ratio of the cost price to the marked price is
(a) 4 : 5 (b) 5 : 4
(c) 5 : 6 (d) 6 : 5
73. A student goes to school at the rate of $\frac{5}{2}$ km/hr and reaches 6 minutes late. If he travels at the speed of 3 km/hr, he reaches 10 minutes earlier. The distance of the school is
(a) 45 km (b) 20 km
(c) 10 km (d) 4 km
74. A certain sum of money is distributed to A and B in the ratio 2 : 5. If A received ₹100, then the money received by B is
(a) ₹ 200 (b) ₹ 150
(c) ₹ 250 (d) ₹ 300
75. A question and two statements labeled (I), (II) are given. You have to decide which statement(s) is/are sufficient to answer the question.
What is the number?
I. The sum of the two digits is 8. The ratio of the two digits is 1 : 3.
II. The product of the two digit of a number is 12. The quotient of two digits is 3.
(a) Statements II alone is sufficient.
(b) Both the statements together are needed.
(c) Statements I alone is sufficient.
(d) Either I or II alone is sufficient.

76. The value of $\left(\frac{-1}{216}\right)^{-\frac{2}{3}}$ is:

- (a) $\frac{1}{36}$ (b) $-\frac{1}{36}$
(c) -36 (d) 36
77. The ussnit's digit in the product $7^{35} \times 3^{71} \times 11^{55}$ is :
(a) 1 (b) 3
(c) 7 (d) 9
78. When the price of a radio was reduced by 20%, its sale increased by 80%. What was the net effect on the sale?
(a) 44% increase (b) 44% decrease
(c) 66% increase (d) 75% increase
79. How much water must be added to 48 ml of alcohol to make a solution that contains 25% alcohol ?
(a) 24 ml (b) 72 ml
(c) 144 ml (d) 196 ml
80. Ravi's salary is 150% of Amit's salary. Amit's salary is 80% of Ram's salary. What is the ratio of Ram's salary to Ravi's salary?
(a) 1 to 2 (b) 2 to 3
(c) 5 to 6 (d) 6 to 5

GENERAL ENGLISH

DIRECTIONS (Qs. 81-83) : Each of the question in this section has a sentence with a blank space and four words given after the sentence. Select whichever word you consider most appropriate for the blank space and indicate your choice on the Answer Sheet.

81. A person who pretends to be what he is not is called an _____.
(a) imbibor (b) impresario
(c) imitator (d) imposter
82. His _____ nature would not let him leave his office before 5 p.m.
(a) honest (b) selfish
(c) unscrupulous (d) conscientious
83. The Committee's appeal to the people for money _____ little response.
(a) evoked (b) provided
(c) provoked (d) prevented
84. Select the word or group of words that is most similar in meaning to the words in capital letters.
PHILANDERER
(a) Time waster (b) Spendthrift
(c) Male flirt (d) Wanderer
85. Select the word or group of words that is most **opposite** in meaning to the words in capital letters.
PROCLIVITY
(a) Speed (b) Weakness
(c) Disgust (d) Disinclination

DIRECTIONS (Qs. 86-87) : Read the passage and then answer the questions based on it. You are required to select your answers based on the contents of the passage and opinion of the author only.

The New Year is a time for resolutions. Mentally at least, most of us could compile formidable lists of do's and don'ts. The same old favourites recur year in and year out with monotonous regularity. Past experience has taught us that certain accomplishments are beyond attainment. If we remain inveterate smokers, it is only because we have so often experienced the frustration that results from failure. Most of us fail in our efforts at self-improvement because our schemes are too ambitious and we never have time to carry them out. We also make the fundamental error of announcing our resolutions to everybody so that we look even more foolish when we slip back into our old bad ways.

86. The author seems to think that others
- feel happy when we slip back to our old ways.
 - do not really want us to improve ourselves.
 - are ready to tease and laugh at our attempts.
 - might embarrass us by praising our attempts.
87. The author says that most of us fail in our attempts at self-improvement because
- we set too high goals for ourselves.
 - we do not have the persistence of mind.
 - our nature is such that we cannot become perfect.
 - certain imperfections have become a part and parcel of our lives.

DIRECTIONS (Qs. 88-91): Each question in this section has a sentence with three underlined parts labelled (a), (b) and (c). Read each sentence to find out whether there is any error in any underlined part and indicate your response in the Answer Sheet against the corresponding letter i.e., (a) or (b) or (c). If you find no error, your response should be indicated as (d).

88. My detailed statement / is respectively
(a) (b)
submitted. / No error.
(c) (d)
89. I am waiting / for my friend / since this morning.
(a) (b) (c)
No error.
(d)
90. He is representing / my constituency
(a) (b)
for the last five years. / No error.
(c) (d)
91. Read the instructions with care / lest you may /
(a) (b) /
misunderstand the questions. / No error.
(c) (d)

DIRECTIONS (Qs. 92-96): In the following questions four alternatives are given for the idiom/phrase italicised and underlined in the sentence. Choose the alternative which best expresses the meaning of idiom/phrase.

92. Sobhraj could be easily arrested because the police were tipped off in a advance.
(a) Toppled over
(b) Bribed
(c) Given advance information
(d) Threatened
93. On the issue of marriage, Sarita put her foot down.
(a) stood up (b) was firm
(c) got down (d) walked fast
94. I met him after a long time, but he gave me the cold shoulder.
(a) scolded me (b) insulted me
(c) abused me (d) ignored me
95. To move heaven and earth
(a) to cause an earthquake
(b) to try everything possible
(c) to pray to all Gods
(d) to tavel in a rocket
96. To smell a rat
(a) to smell foul (b) to see a rat
(c) to chase a rat (d) to be suspicious

DIRECTIONS (Qs. 97-100): In the following passage, some of the words have been left out. Read the passage carefully and choose the correct answer to each question out of the four alternatives and fill in the blanks.

A team of Indian engineers 97 shown that digital photographs of the hand may 98 cholesterol levels in the body and serve as an early warning signal 99 poor lipid health without a standard blood test. Researchers believe the programme may be 100 in the future and using into mobile phones to enable it to analyses digital images of the hand captured in the camera on a mobile phone.

97. (a) has been (b) are
(c) have (d) has
98. (a) conceal (b) conjecture
(c) reveal (d) conduct
99. (a) of (b) before
(c) at (d) by
100. (a) resolved (b) refined
(c) retracted (d) recorded

HINTS & EXPLANATIONS

1. (d) Electric current is measured using a device called an ammeter.
2. (d) The correct match is as follows:
Ascorbic acid- Vitamin C
Chlorophyll- Photosynthetic pigment
Carotenoid- Quencher
Superoxide dismutase- Enzyme
3. (a) Although most DNA is packaged in chromosomes within the nucleus, mitochondria also have a small amount of their own DNA. This genetic material is known as mitochondrial DNA or mtDNA
4. (b) Needle exerts more pressure than nail on the balloon.
5. (c) The speed of sound is greater in moist air than in dry air because moist air have larger density than dry air. Velocity of sound is directly proportional to the density of the medium in which it travels.
6. (a) When ice is kept on saw dust then it does not melt quickly as it's an insulator of heat and air does not circulate in good insulators. So, it prevents ice from melting quickly.
7. (a) When a drop of Glycerol is added to crushed KMnO_4 spread on a paper there is a violent explosion.
8. (a) Hydrogen- peroxide is an effective sterilizing agent. Water results when it readily loses active oxygen.
9. (a) The term 'brown air' is used for photochemical smog. The brown color is caused by the presence of various Nitrous Oxides.
10. (b) Wave particle duality is a quantum mechanics effect. It means the electron sometimes acts like a particle and sometimes it acts like a wave. It depends on the situations.
11. (d) Steam will produce more severe burns than boiling water because steam has more heat energy than water due to its latent heat of vaporisation.
12. (b) 'Dentrification' is the biological conversion of nitrate to nitrogen gas, nitric oxide or nitrous oxide. These compounds are gaseous compounds and are not readily available for microbial growth; therefore they are typically released to the atmosphere.
13. (c) Coagulation removes dirt and other particles suspended in water. Alum and other chemicals are added to water to form tiny sticky particles called "floc" which attract the dirt particles. The combined weight of the dirt and the alum (floc) become heavy enough to sink to the bottom during sedimentation.
14. (c) Retroviral integrase (IN) is an enzyme produced by a retrovirus (such as HIV) that enables its genetic material to be integrated into the DNA of the infected cell.
15. (c)
16. (b) The retina of the eye has two types of light-sensitive cells called rods and cones. Both are found in the retina which processes images. Rods work in low light conditions to help night vision, but cones work in daylight and are responsible for colour discrimination.
17. (a) 18. (b) 19. (d) 20. (c) 21. (c)
22. (b) 23. (d) 24. (c) 25. (a) 26. (d)
27. (a) 28. (a)
29. (b) Red light scatters much less than lights of other color due to its greater wavelength.
30. (d) The nutritive tissue in the seeds of higher plants is known as endosperm. Endosperm is the tissue produced inside the seeds of most flowering plants around the time of fertilization. It surrounds the embryo and provides nutrition in the form of starch, though it can also contain oils and protein.
31. (c) 32. (b) 33. (c) 34. (c) 35. (b)
36. (d) 37. (c) 38. (d) 39. (b) 40. (b)
41. (d) $\left(\frac{-1}{216}\right)^{\frac{2}{3}} = \left(\frac{-1}{6^3}\right)^{\frac{2}{3}}$
 $= \left(-\frac{1}{6}\right)^{-2} = (-6)^2 = 36$
42. (a) Unit's digit in $(7^4) = 1$. Therefore, unit's digit in $(7^4)^8$ i.e. 7^{32} will be 1. Hence, unit's digit in $(7)^{35} = 1 \times 7 \times 7 \times 7 = 3$
Again, unit's digit in $(3)^4 = 1$
Therefore, unit's digit in the expansion of $(3^4)^{17} = (3)^{68} = 1$
 \Rightarrow Unit's digit in the expansion of $(3^{71}) = 1 \times 3 \times 3 \times 3 = 7$
and unit's digit in the expansion of $(11^{35}) = 1$
Hence, unit's digit in the expansion of $7^{35} \times 3^{71} \times 11^{55} = 3 \times 7 \times 1 = 1$
43. (a) Let the original price be x and sale be of y units. Then, the revenue collected initially = $x \times y$
Now, new price = $0.8x$, new sale = $1.8y$
Then, new revenue collected = $1.44xy$

$$\% \text{ increase in revenue} = \frac{0.44xy}{xy} \times 100 = 44\%$$

Shortcut Method

$$\begin{aligned} \text{Net effect} &= -20 + 80 + \frac{(-20 \times 80)}{100} \\ &= 60 - 16 = 44\% \end{aligned}$$

44. (c) Let quantity of water to be added be x ml.

$$\text{Then, } (x + 48) \times \frac{25}{100} = 48 \text{ or } x = 144 \text{ ml.}$$

45. (c) Let the salary of Ram be ₹ 100.

Then, salary of Amit = ₹ 80

and salary of Ravi = 150% of 80 = ₹ 120

Ratio of Ram's salary to Ravi's salary

$$= 100 : 120 = 5 : 6$$

46. (b) Let the rate of interest be $r\%$.

$$\text{Therefore, } \frac{2646}{2400} = \frac{\left(1 + \frac{r}{100}\right)^4}{\left(1 + \frac{r}{100}\right)^3}$$

$$\Rightarrow 1 + \frac{r}{100} = \frac{21}{20} \text{ or } r = 5\%$$

47. (b) Amount = 6000

Rate = 10%

First year interest

$$= \frac{6000 \times 10 \times 1}{100} = ₹ 600$$

At the end of first year amount

$$= 6000 + 600 - 2000 = 4600$$

At the end of second year

$$\text{Interest} = \frac{4600 \times 10 \times 1}{100} = 460$$

At the second year amount

$$= 4600 + 460 - 2000 = 3060$$

At the end of third year

$$\text{Interest} = \frac{3060 \times 10 \times 1}{100} = 306$$

Amount at the end of third year

$$= 3060 + 306 = ₹ 3366$$

Amount refund in third year

$$= ₹ 3366$$

48. (c) Let the cost price be ₹ 100.

Gain of 33% = ₹ 33

$$\Rightarrow \text{SP} = ₹ 133$$

Let the marked price be ₹ x . The SP of ₹ 133 has been arrived after giving a discount of 5% on marked price.
i.e. $x \times 0.95 = ₹ 133$

$$\Rightarrow x = \frac{133}{0.95} = ₹ 140$$

Required increase = ₹ 140 - ₹ 100 = ₹ 40

Hence required percentage = 40%.

49. (c) Total score of 40 innings = $40 \times 50 = 2000$

Total score of 38 innings = $38 \times 48 = 1824$

Let the highest score be x and the lowest score be y .

Sum of the highest and the lowest score

$$= x + y = 2000 - 1824$$

$$\Rightarrow x + y = 176 \quad \dots(i)$$

$$\text{and by question, } x - y = 172 \quad \dots(ii)$$

Solving (i) and (ii), we get $x = 174$

50. (d) To construct a triangle, it is necessary that the sum of any two sides is greater than the third side. Checking with options, we find that it is not possible for the measurements given in (d) as $2.3 + 4.4 < 6.8$.

51. (a) If $f(x) = 0$ at $x = 0$, then $(x - 0)$ is a factor of $f(x)$.

Checking with the options, we find that

$$f(2) = (2)^3 - 19 \times (2) + 30 = 0$$

Therefore, $x - 2$ is a factor of

$$x^3 - 19x + 30$$

52. (c) $2x^2 - 7xy + 3y^2 = 0$

$$2\left(\frac{x}{y}\right)^2 - 7\left(\frac{x}{y}\right) + 3 = 0 \quad (\text{Dividing by } y^2)$$

$$\frac{x}{y} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{7 \pm \sqrt{49 - 24}}{2 \times 2} = \frac{7 \pm 5}{4} = 3, \frac{1}{2}$$

$$\Rightarrow \frac{x}{y} = \frac{3}{1} \text{ or } \frac{x}{y} = \frac{1}{2}$$

Hence, $x : y = 3 : 1$ or $1 : 2$

53. (d) Given, $27 \times (81)^{2n+3} - 3^m = 0$

$$\Rightarrow 3^3 \times (3)^{8n+12} = 3^m$$

$$\Rightarrow 3^{8n+15} = 3^m$$

$$\Rightarrow 8n + 15 = m \quad (\text{on comparing})$$

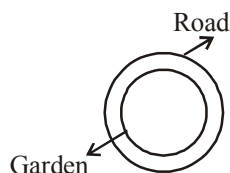
54. (b) We have $\tan A = \frac{1}{2}$ and $\tan B = \frac{1}{3}$
Now,
$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B} = \frac{\frac{1}{2} + \frac{1}{3}}{1 - \frac{1}{2} \cdot \frac{1}{3}} = 1$$

$$\Rightarrow \tan(A+B) = \tan \frac{3\pi}{4}$$

Hence, $A+B = \frac{3\pi}{4}$

55. (b) $\cos 1^\circ \cdot \cos 2^\circ \cdot \cos 3^\circ \dots \cos 179^\circ$
As value of $\cos 90^\circ = 0$
 $\therefore \cos 1^\circ \cdot \cos 2^\circ \cdot \cos 3^\circ \dots \cos 179^\circ = 0$
56. (b) Percentage increase in the production of monopoly
$$= \frac{(125-105)}{105} \times 100 = \frac{20}{105} \times 100$$

$$= 19.05\% \approx 20\%$$
57. (c) Production of monopoly has shown continuous increase over the years.
58. (d) % drop $= \frac{200-180}{200} \times 100 = 10\%$
59. (b) Let R be the radius of circular road



i.e., R = radius of outer circle.

Let r be the radius of inner circle (garden).

circumference of the road $= 2\pi R$

circumference of the garden $= 2\pi r$

Given: $2\pi R - 2\pi r = 44$ m

$$\Rightarrow 2\pi(R-r) = 44 \Rightarrow R-r = 7\text{m}$$

Hence, the width of the road $= R-r = 7\text{m}$

60. (c) Area of the circle $= \pi(x)^2$ where radius of circle $= x$
Let side of the square be y.

$$\text{Then, } y^2 = \pi(x)^2 \Rightarrow y = x\sqrt{\pi}$$

Perimeter of the square is $= 4y = 4x\sqrt{\pi}$

61. (b) \therefore Product of numbers $= (\text{LCM} \times \text{HCF})$
 $\Rightarrow 480 \times \text{second number} = 2400 \times 16$
 $\Rightarrow \text{second number} = 80$

62. (a) Average age of the remaining boys

$$= \frac{(80 \times 15) - (15 \times 16 + 25 \times 14)}{40}$$

$$= \frac{1200 - 590}{40} = 15.25$$

63. (a) S.P. = ₹ 330, Gain = 10%

$$\therefore \text{C.P.} = \left(\frac{100}{100 + \text{Gain \%}} \right) \times \text{S.P.}$$

$$= ₹ \frac{100}{100+10} \times 330$$

$$= \frac{100}{110} \times 330 = ₹ 300.$$

64. (d) Share of Urmila in dividend $= \left(\frac{2}{6} \times 57834 \right)$
 $= ₹ 19278$

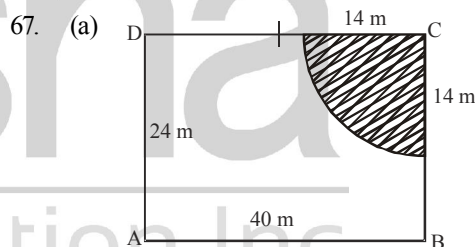
65. (b) We have :
x men to the work in 60 days and (x+8) men do the work in
(60-10) = 50 days.

Then by "basic formula", $60x = 50(x+8)$

$$\therefore x = \frac{50 \times 8}{10} = 40 \text{ men.}$$

66. (a) Speed $= \left(\frac{750}{150} \right) \text{ m/sec} = 5 \text{ m/sec}$

$$= \left(5 \times \frac{18}{5} \right) \text{ km/hr} = 18 \text{ km/hr.}$$



Area of the shaded portion

$$= \frac{1}{4} \times \pi (14)^2 = 154 \text{ m}^2$$

68. (b) $\frac{\text{True weight}}{\text{False weight}} = \frac{100 + \text{gain\%}}{100 + x}$

Here S.P. = C.P. $\therefore x = 0$

\Rightarrow False weight

$$= \frac{1000 \times 100}{125} = 800 \text{ gm}$$

69. (b) Let work will be completed in x days. Then,
work done by A in (x-3) days + work done by B in x days = 1

$$\frac{x-3}{9} + \frac{x}{18} = 1 \Rightarrow 3x = 24 \Rightarrow x = 8 \text{ days.}$$

70. (b) usual time $\times \left(\frac{4}{5} - 1\right) = \frac{-30}{60}$

$$\Rightarrow \text{usual time} = \frac{1}{2} \times 5 = 2\frac{1}{2} \text{ hr}$$

71. (d) $\sqrt[3]{9}, \sqrt[4]{20}, \sqrt[6]{25}$

LCM of 3, 4, 6 = 24

$$\sqrt[24]{9^8}, \sqrt[24]{20^6}, \sqrt[24]{25^4}$$

$$\sqrt[24]{25^4} < \sqrt[24]{9^8} < \sqrt[24]{20^6}$$

i.e. $\sqrt[6]{25} < \sqrt[3]{9} < \sqrt[4]{20}$

72. (c)

C.P.	M.P.	S.P.
x	100	90
	10% discount	

Let cost price (C.P.) = ₹ x

& Marked price (M.P.) = ₹ 100

$$x \times \frac{108}{100} = 90$$

$$x = \frac{90 \times 100}{108}$$

New cost price : cost price

$$\frac{90 \times 100}{108} : 100 = 5 : 6$$

73. (d) Let original time taken by student be x hours.

$$\frac{5}{2} \left(x + \frac{6}{60} \right) = \left(x - \frac{10}{60} \right)$$

$$5x + \frac{1}{2} = 6x - 1$$

$$x = \frac{3}{2} \text{ hours}$$

\therefore distance of school

$$= \frac{5}{2} \times \left(\frac{3}{2} + \frac{1}{10} \right) = 4 \text{ km}$$

74. (c) Let 'x' be the total sum of money.

$$\text{Money received by A} = \frac{2}{7} \times x$$

$$\Rightarrow 100 = \frac{2}{7} \times x \Rightarrow x = ₹ 350$$

$$\therefore \text{Money received by B} = \frac{5}{7} \times 350 = ₹ 250$$

75. (d) Let the tens and units digit be x and y respectively.
Then,

I. $x + y = 8$ and $\frac{x}{y} = \frac{1}{3}$

$$\therefore \text{I gives, } 4y = 24 \Leftrightarrow y = 6.$$

$$\text{So, } x + 6 = 8 \Leftrightarrow x = 2.$$

II. $xy = 12$ and $\frac{x}{y} = \frac{3}{1}$

$$\therefore \text{II gives } x^2 = 36 \Leftrightarrow x = 6.$$

$$\text{So, } 3y = 6 \Leftrightarrow y = 2.$$

Therefore, Either I or II alone sufficient to answer.

76. (d) $\left(\frac{-1}{216}\right)^{-\frac{2}{3}} = \left(\frac{-1}{6^3}\right)^{-\frac{2}{3}}$
 $= \left(-\frac{1}{6}\right)^2 = (-6)^2 = 36$

77. (a) Unit's digit in $(7^4) = 1$. Therefore, unit's digit in $(7^4)^8$

i.e. 7^{32} will be 1. Hence, unit's digit in

$$(7)^{35} = 1 \times 7 \times 7 \times 7 = 3$$

$$\text{Again, unit's digit in } (3)^4 = 1$$

Therefore, unit's digit in the expansion of

$$(3^4)^{17} = (3)^{68} = 1$$

\Rightarrow Unit's digit in the expansion of

$$(3^{71}) = 1 \times 3 \times 3 \times 3 = 7$$

$$\text{and unit's digit in the expansion of } (11^{35}) = 1$$

Hence, unit's digit in the expansion of

$$7^{35} \times 3^{71} \times 11^{55} = 3 \times 7 \times 1 = 1$$

78. (a) Let the original price be x and sale be of y units.

Then, the revenue collected initially = $x \times y$

Now, new price = $0.8x$, new sale = $1.8y$

Then, new revenue collected = $1.44xy$

% increase in revenue

$$= \frac{0.44xy}{xy} \times 100 = 44\%$$

Shortcut Method

$$\text{Net effect} = -20 + 80 + \frac{(-20 \times 80)}{100}$$

$$= 60 - 16 = 44\%$$

79. (c) Let quantity of water to be added be x ml.

$$\text{Then, } (x + 48) \times \frac{25}{100} = 48 \text{ or } x = 144 \text{ ml.}$$

80. (c) Let the salary of Ram be ₹ 100.

Then, salary of Amit = ₹ 80

and salary of Ravi = 150% of 80 = ₹ 120

Ratio of Ram's salary to Ravi's salary

$$= 100 : 120 = 5 : 6$$

81. (d) Imbiber means one who absorbs something. Impresario means a person who organizes concert and plays. Imitator is the one who copies another person. Imposter is the pretender, so correct answer is option (d).
82. (d) Honest means truthful. Selfish is a person who just thinks about himself. Unscrupulous means dishonest. Conscientious means diligent or hardworking. Looking at the sentence, it is understood that the person is very hardworking. Thus option (d) is the best answer.

83. (a) Evoke means bring to mind and when a response is needed. Thus clearly option (a) is the answer. Provided means given with. Provoked means to incite. Prevent means to stop. Thus these meanings do not fit here.
84. (c) 'Philanderer' means 'a man who has sexual relations with different women.'
85. (d) 'Proclivity' means a natural tendency (or inclination) to do something.
86. (c) The author says that we look even more foolish when we slip back into our old bad ways.
87. (b) The author says we fail in our attempts because we never have time to carry them out.
88. (b) My detailed statement is respectfully submitted.
89. (a) I have been waiting for my friend since morning.
90. (a) He has been representing my constituency for the past five years.
91. (d) No error
92. (c)
93. (b) Idiom **put your foot down** means : to be very strict in opposing what somebody wishes to do; to drive faster.
94. (d)
95. (b) Idiom 'To move heaven and earth' means: to try everything possible, to exert the utmost effort.
96. (d) Idiom 'To smell a rat' means: to believe that something is wrong in a particular situation, to be suspicious.
97. (d) 98. (c) 99. (a) 100. (b)