SSC-JE

Staff Selection Commission Junior Engineer

Recruitment Examination

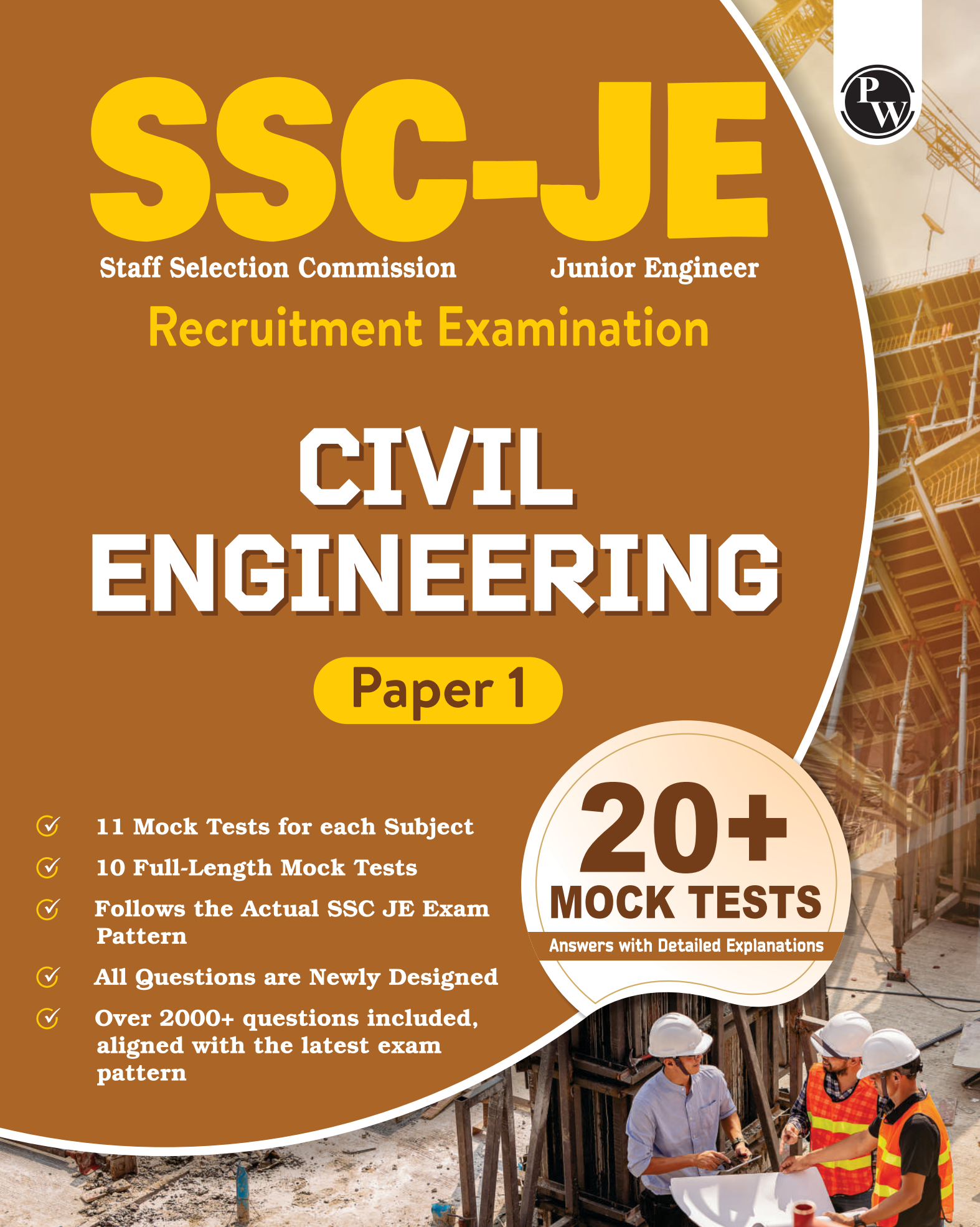
CIVIL ENGINEERING

Paper 1

- 11 Mock Tests for each Subject
- 10 Full-Length Mock Tests
- Follows the Actual SSC JE Exam Pattern
- All Questions are Newly Designed
- Over 2000+ questions included, aligned with the latest exam pattern

20+ MOCK TESTS

Answers with Detailed Explanations



CONTENTS

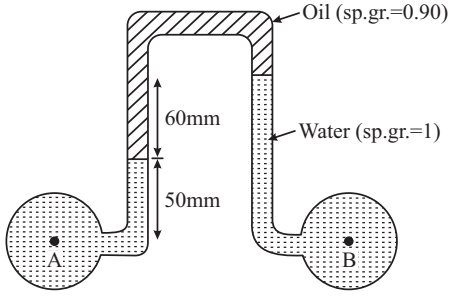
Mock Tests

Mock Test 1

Subject: Hydraulics

Total No. of Questions : 25	Time : 20 Minutes	Maximum Marks : 25 Negative Marking : 0.33

1. In the set up shown in the figure, assuming the specific weight of water as 1000 N/m^3, the pressure difference between the point A and B will be



(*a*) 40 N/m^2 (*b*) –30 N/m^2
(*c*) 60 N/m^2 (*d*) –60 N/m^2

2. A two-dimensional flow is described by velocity components $u = 2x$ and $v = -2y$. The discharge between points (2, 2) and (3, 3) is equal to

(*a*) 10 units (*b*) 12 units (*c*) 8 units (*d*) 6 units

3. What shall be pressure head of a liquid of specific gravity 0.8 for a pressure head of 100 m of water

(*a*) 80 m (*b*) 125 m (*c*) 160 m (*d*) 64 m

4. A steady, two-dimensional, incompressible flow field is represented by $u = x + 3y + 3$ and $v = 2x - y - 8$ In this flow field, the stagnation point is

(*a*) (–2, 3) (*b*) (–3, 2) (*c*) (–2, –3) (*d*) (3, –2)

5. If E_C is specific energy at critical depth Y_C in a triangular channel, the value of $\frac{E_C}{Y_C}$ is

(*a*) 3.33 (*b*) 2.5 (*c*) 1.5 (*d*) 1.25

6. Match the following lists:

	List – I		List – II
A.	Strong hydraulic jump	p	$F_r < 1.70$
B.	Weak hydraulic jump	q	$4.5 < F_r < 9.0$
C.	Undular hydraulic jump	r	$F_r > 9.0$
D.	Steady hydraulic jump	s	$1.7 < F_r < 2.5$

where F_r is initial Froude Number. Select the correct answer using the codes given below.

(*a*) A-r, B-s, C-p, D-q

(*b*) A-s, B-r, C-q, D-p

(*c*) A-s, B-r, C-p, D-q

(*d*) A-r, B-s, C-q, D-p

7. In a 90° triangular notch, the error in the estimated discharge for a given head due to an error of 1% in cutting the vertex angle is

(*a*) Zero (*b*) π% (*c*) $\frac{\pi}{2}$% (*d*) 1%

8. If V = mean velocity, R = hydraulic radius; S = bottom slope of channel and n = Manning's coefficient then Manning formula for channel flow is given by

(*a*) $V = (R^{1/3} S^{1/2})/n$ (*b*) $V = (R^{1/2} S^{2/3})/n$
(*c*) $V = (R^{2/3} S^{1/2})/n$ (*d*) $V = (R^{1/2} S^{1/3})/n$

9. Hydraulic radius is equal to

(*a*) Area divided by the wetted perimeter

(*b*) Area divided by the square of the wetted perimeter

(*c*) Wetted perimeter divided by area

(*d*) Square root of the area

10. If the Froude number of a hydraulic jump is more than 9, this jump is classified as-

(*a*) Weak jump (*b*) Strong jump
(*c*) Oscillating jump (*d*) None of these

11. The correct sequence in the direction of the flow of water for installation of Hydropower plant is

(*a*) Reservoir, surge tank, turbine, penstock

(*b*) Reservoir, penstock, surge tank, turbine

(*c*) Reservoir, penstock, turbine, surge tank

(*d*) Reservoir, surge tank, penstock, turbine

12. The specific speed of a turbine is speed of an imaginary turbine, identical with the given turbine, which

(*a*) Delivers unit discharge under unit head

(*b*) Delivers unit discharge under unit speed

(*c*) Develops unit horse power under unit head

(*d*) Develops unit horse power under unit speed

13. Match List–I with List–II and select the correct answer:

	List–I		List–II
A.	Toothpaste	p	Thixotropic fluids
B.	Butter	q	Pseudo plastic fluids
C.	Syrup	r	Bingham plastic fluids
D.	Printer's ink	s	Dilatant fluids

(*a*) A-p, B-r, C-q, D-s

(*b*) A-q, B-r, C-s, D-p

(*c*) A-r, B-s, C-q, D-p

(*d*) A-s, B-p, C-r, D-q

14. If the capillary rise of oil in a 0.8 m diameter tube is 4 cm and the specific gravity is 0.8, the height capillary rise of oil in a 1.6 mm diameter tube (in cm) will be:

(*a*) 1 (*b*) 4

(*c*) 8 (*d*) 2

15. 15 cm length of steel rod with relative density of 7.5 is submerged in a two layer fluid. The bottom layer is mercury and the top layer is water. The height of top surface of the rod above the liquid interface (in cm) is

(*a*) 8.14 (*b*) 6.82

(*c*) 7.94 (*d*) 7.3

16. An ice-berg is partially submerged in sea water of density 1050 kg/m^3. The density of ice berg is 900 kg/m^3. Calculate the fraction of the total volume of ice-berg above the level of sea water.

(*a*) 14.28% (*b*) 34%

(*c*) 85.72% (*d*) 7.14%

17. If δ_1 and δ_2 is the laminar boundary layer thickness at a point '*M*' distant '*x*' from the leading edge when the Reynolds number of the flow are 110 and 440, respectively, then the ratio $\frac{\delta_1}{\delta_2}$ will be

(*a*) 0.5 (*b*) 4 (*c*) 3.2 (*d*) 5.45

18. The friction factor for a channel is 0.0313, the chezy's constant will be

(*a*) 60 (*b*) 50

(*c*) 45 (*d*) 75

19. The specific speed (N_s) of a water turbine is expressed by which of the following equations?

(*a*) $N_s = \frac{N\sqrt{P}}{H^{3/4}}$ (*b*) $N_s = \frac{N\sqrt{P}}{H^{5/4}}$

(*c*) $N_s = \frac{N\sqrt{P}}{H^{2/3}}$ (*d*) $N_s = \frac{\sqrt{N}\sqrt{P}}{H^{3/2}}$

20. The depth of water below the spillway and after hydraulic jump are 2 m and 8 m respectively. The energy loss will be

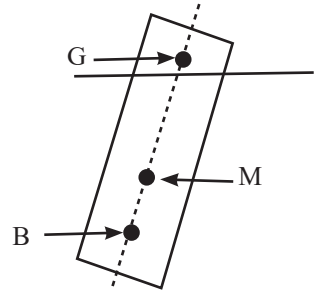
(*a*) 2.35 (*b*) 3.375

(*c*) 8.6 (*d*) 5.2

21. Water flows at a depth of 0.1 m with a velocity of 6 m/s in a rectangular channel. The alternate depth is:

(*a*) 0.30 m (*b*) 0.40 m (*c*) 0.86 m (*d*) 0.81 m

22. A body is floating as shown in the given figure. The centre of buoyancy, centre of gravity and metacenter are labelled respectively as B, G and M. The body is



(*a*) Vertically stable (*b*) Vertically unstable

(*c*) Rotationally stable (*d*) Rotationally unstable

23. What is the hydraulic radius for a most economical triangular channel flowing with 2.82m depth of water.

(*a*) 1 m (*b*) 2.82 m (*c*) 1.41 m (*d*) 0.8 m

24. To generate 10,000 hp under a head of 81 m while working at a speed of 500 rpm, the turbine of choice would be

(*a*) Pelton (*b*) Bulb

(*c*) Kaplan (*d*) Francis

25. Cavitation is observed at locations in pipe flow where:

(*a*) Pressure falls below atmospheric pressure

(*b*) Pressure rises beyond the pipes strength

(*c*) Shear stress exceeds the shear strength of pipe material

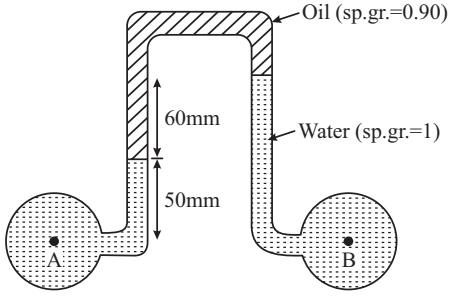
(*d*) Pressure falls below the vapour pressure of liquid

Answer Key

1. (*d*)	**2.** (*a*)	**3.** (*b*)	**4.** (*d*)	**5.** (*d*)	**6.** (*a*)	**7.** (*c*)	**8.** (*c*)	**9.** (*a*)	**10.** (*b*)
11. (*b*)	**12.** (*c*)	**13.** (*c*)	**14.** (*d*)	**15.** (*d*)	**16.** (*a*)	**17.** (*a*)	**18.** (*b*)	**19.** (*b*)	**20.** (*b*)
21. (*d*)	**22.** (*d*)	**23.** (*a*)	**24.** (*d*)	**25.** (*d*)					

Hints and Solutions

1. (*d*)



Starting from point *A*.

$P_A = 1000 \times 10 \times 0.050 + 900 \times 10 \times 0.060 - 1000 \times 10 \times 0.110 + P_B$

$\therefore P_A - P_B = 500 + 540 - 1100$

$= -60$ N/m^2 (g = 10 m/sec^2)

2. (*a*) $u = 2x$

$$\left(\frac{-\partial\psi}{\partial y}\right) = 2x$$

$$\Rightarrow \int \partial\psi = -\int 2x\partial y$$

$$\Rightarrow \psi = -2xy + C$$

$$\psi_{(2,2)} = -2\times2\times2 + C = (-8 + C)$$

$$\psi_{(3,3)} = -2\times3\times3 + C = (-18 + C)$$

$$Q = \psi_{(1,1)} - \psi_{(2,2)} = -8 + C + 18 - C$$

$= 10$ unit.

3. (*b*) Given data:

Pressure head of water $h_w = 100$ m

Specific gravity of fluid = 0.8

$P_w = P_L$

$\rho_w \times g \times h_w = \rho_L \times g \times h_L$

$\rho_w \times h_w = 0.8 \times \rho_w \times h_L$

$$h_L = \frac{100}{0.8}$$

$h_L = 125$ m

4. (*d*) $u = x + 3y + 3$

$v = 2x - y - 8$

For stagnation point, $u = 0$ and $v = 0$

$\Rightarrow x + 3y + 3 = 0$ …(i)

$3(2x - y - 8) = 0$

$\Rightarrow 6x - 3y - 24 = 0$

$x + 3y + 3 = 0$

$7x = 21$

$x = 3$

Put $x = 3$ in equation (i)

$3 + 3y + 3 = 0$

$\Rightarrow y = -2$

So, $x = 3$, $y = -2$

5. (*d*) The total head or energy head (H), at any location In an open channel, can be defined as

$$H = z + y + \frac{V^2}{2g}$$

By assuming kinetic energy factor ($a = 1$) and pressure distribution is hydrostatic.

Using channel bottom as datum ($z = 0$), The total head or energy head above the channel bottom is called specific energy.

$$E = y + \frac{V^2}{2g}$$

For critical flow in triangular channel

$$E_c = y_c + \frac{V_c^2}{2g} \quad \text{...(i)}$$

Full Length Test 5

Total No. of Questions : 200	Time : 120 Minutes	Maximum Marks : 200 Negative Marking : 0.33

SECTION A: GENERAL INTELLIGENCE AND REASONING

1. Study the following information to answer the given questions:

A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an illustration of input and rearrangement:

Input: base 35 or gone 62 49 87 ahead

Step 1: ahead base 35 or gone 62 49 87

Step 2: ahead 87 base 35 or gone 62 49

Step 3: ahead 87 base 35 gone or 62 49

Step 4: ahead 87 base 35 gone 62 or 49

Step 5: ahead 87 base 35 gone 62 or 49

What should be Step 6?

(*a*) ahead 87 base 35 gone 62 or 49
(*b*) ahead 87 base 35 gone 62 49 or
(*c*) ahead 87 base 62 gone 35 or 49
(*d*) ahead 87 base 35 gone 62 49 or

2. **Statements:** $P \geq Q > R = S < T \leq U$

Conclusions:

I. $P > S$

II. $U > R$

III. $T \geq Q$

(*a*) Only I is true (*b*) Only I and II are true
(*c*) Only I and III are true (*d*) All are true

3. Find the missing number: 3, 7, 16, 35, ?, 153

(*a*) 74 (*b*) 76
(*c*) 78 (*d*) 80

4. Complete the series: AZ, CX, FU, JQ, ?

(*a*) OK (*b*) OL
(*c*) PK (*d*) PM

5. Find the next term: 2, 6, 30, 210, 2310, ?

(*a*) 30030 (*b*) 32032
(*c*) 30240 (*d*) 32130

6. Choose the option which is related to the fifth letter-cluster in the same way as the second letter-cluster is related to the first and the fourth letter-cluster is related to the third letter-cluster.

WIRE: RJWF :: PICK: CJPL :: IMLI:?

(*a*) LIMI
(*b*) INMI
(*c*) INLJ
(*d*) LNIJ

7. What is the age of Rahul?

I. The ratio of Rahul's age to his father's age is 2:5

II. After 6 years, the ratio becomes 1:2

(*a*) Statement I alone is sufficient
(*b*) Statement II alone is sufficient
(*c*) Both statements together are sufficient
(*d*) Both statements together are not sufficient

8. Read the statement below and determine the correct conclusion.

Statements: "If you work hard, you will succeed." "Ram did not succeed."

What can be concluded about Ram?

(*a*) Ram worked hard
(*b*) Ram did not work hard
(*c*) Ram may or may not have worked hard
(*d*) Nothing can be concluded

9. Select the option that is related to the third term in the same way as the second term is related to the first term.

BACTERIA: EXFWBUFX :: WOUNDS:?

(*a*) ZLRQGV (*b*) YLRQFV
(*c*) ZLSQFW (*d*) ZRXQGV

10. CLOTH : MILL :: NEWSPAPER : ?

(*a*) Press (*b*) Editor
(*c*) News (*d*) Reader

11. If the number 1 on the clock is replaced by the letter 'M', the number 2 is replaced by 'N' and so on, then when the time is 21:00 p.m. the hour hand will be at letter.

(*a*) T (*b*) S
(*c*) V (*d*) U

12. At half past 5 in the evening, the smaller angle between the hour & minute hands of a clock is

(*a*) 10° (*b*) 12°
(*c*) 15° (*d*) 18°

13. If 25th of August in a year is Thursday, then how many Tuesdays will be there in that month ?

(*a*) 5 (*b*) 4
(*c*) 6 (*d*) 3

14. How many meaningful English words can be made from the letters ACER using each letter only once?

(*a*) 3 (*b*) 4
(*c*) 5 (*d*) 6

15. Arrange the words in meaningful order:

1. Foundation 2. Walls
3. Roof 4. Room
5. Floors

(*a*) 1, 2, 5, 4, 3
(*b*) 1, 5, 2, 4, 3
(*c*) 1, 2, 4, 5, 3
(*d*) 2, 1, 5, 4, 3

16. In a code language, 'SOGGY' is written as '78' and 'PLINTH' is written as '85'. How will 'DEVOTION' be written in that language?

(*a*) 112 (*b*) 120
(*c*) 104 (*d*) 98

17. Select the option that is related to the third word in the same way as the second word is related to the first word.

Rubella : Virus :: Malaria : ?

(*a*) Virus
(*b*) Fungi
(*c*) Bacteria
(*d*) Parasite

18. Select the option in which the words share the same relationship as that shared by the given pair of words.

Office : Work

(*a*) House : Bricks (*b*) Hospital : Director
(*c*) School : Study (*d*) Court : Lawyer

19. Replace the question mark with an option that follows the same logic applied in the first pair.

DAUGHTER : ADGUTHRE :: SHIMMERY : ??

(*a*) HSMIEMYR (*b*) HSIEMMYR
(*c*) HSMIEYMR (*d*) HSMIMEYR

20. In a certain code, 'LISTEN' is written as 'RNCHOA', and 'HEAR' is written as 'GOLM'. How is 'NAIL' written in that same code?

(*a*) ALNR (*b*) ANLR
(*c*) ALRN (*d*) LANR

21. Which number will replace the question mark (?) in the following series?

28, 32, 41, 57, 82, ?

(*a*) 120 (*b*) 118
(*c*) 116 (*d*) 122

22. What should come in place of X in the given series?

16, 22, 31, 43, X

(*a*) 60 (*b*) 58
(*c*) 59 (*d*) 61

23. Select the number that can replace the question mark (?) in the following series.

33, 53, 61, 85, 97, ?, 141

(*a*) 125 (*b*) 113
(*c*) 123 (*d*) 121

24. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

I. Some blue are yellow.

II. Some yellow are green.

Conclusions:

I. Some blue are green.

II. Some blue are not green.

(*a*) Only conclusion (1) follows.
(*b*) Only conclusion (II) follows.
(*c*) Both conclusion follow.
(*d*) Neither conclusion (1) nor conclusion (11) follows.

Answer Key

1. (*b*)	**2.** (*b*)	**3.** (*a*)	**4.** (*b*)	**5.** (*a*)	**6.** (*d*)	**7.** (*c*)	**8.** (*b*)	**9.** (*a*)	**10.** (*a*)
11. (*d*)	**12.** (*c*)	**13.** (*a*)	**14.** (*c*)	**15.** (*a*)	**16.** (*a*)	**17.** (*d*)	**18.** (*c*)	**19.** (*a*)	**20.** (*c*)
21. (*b*)	**22.** (*b*)	**23.** (*a*)	**24.** (*d*)	**25 .** (*d*)	**26.** (*c*)	**27.** (*b*)	**28.** (*a*)	**29.** (*c*)	**30.** (*d*)
31. (*c*)	**32.** (*d*)	**33.** (*b*)	**34.** (*b*)	**35.** (*d*)	**36.** (*c*)	**37.** (*c*)	**38.** (*b*)	**39.** (*a*)	**40.** (*b*)
41. (*c*)	**42.** (*d*)	**43.** (*b*)	**44.** (*c*)	**45.** (*d*)	**46.** (*b*)	**47.** (*a*)	**48.** (*b*)	**49.** (*d*)	**50.** (*d*)
51. (*c*)	**52.** (*b*)	**53.** (*b*)	**54.** (*b*)	**55.** (*c*)	**56.** (*a*)	**57.** (*c*)	**58.** (*b*)	**59.** (*b*)	**60.** (*a*)
61. (*d*)	**62.** (*a*)	**63.** (*b*)	**64.** (*a*)	**65.** (*c*)	**66.** (*c*)	**67.** (*c*)	**68.** (*a*)	**69.** (*d*)	**70.** (*d*)
71. (*d*)	**72.** (*c*)	**73.** (*a*)	**74.** (*c*)	**75.** (*c*)	**76.** (*b*)	**77.** (*c*)	**78.** (*d*)	**79.** (*c*)	**80.** (*b*)
81. (*b*)	**82.** (*c*)	**83.** (*c*)	**84.** (*c*)	**85.** (*b*)	**86.** (*c*)	**87.** (*c*)	**88.** (*c*)	**89.** (*b*)	**90.** (*c*)
91. (*c*)	**92.** (*b*)	**93.** (*b*)	**94.** (*a*)	**95.** (*d*)	**96.** (*b*)	**97.** (*a*)	**98.** (*d*)	**99.** (*c*)	**100.** (*a*)
101. (*a*)	**102.** (*c*)	**103.** (*c*)	**104.** (*b*)	**105.** (*c*)	**106.** (*c*)	**107.** (*b*)	**108.** (*d*)	**109.** (*a*)	**110.** (*a*)
111. (*c*)	**112.** (*c*)	**113.** (*b*)	**114.** (*b*)	**115.** (*a*)	**116.** (*b*)	**117.** (*a*)	**118.** (*b*)	**119.** (*a*)	**120.** (*b*)
121. (*d*)	**122.** (*c*)	**123.** (*c*)	**124.** (*b*)	**125.** (*c*)	**126.** (*b*)	**127.** (*d*)	**128.** (*a*)	**129.** (*d*)	**130.** (*b*)
131. (*b*)	**132.** (*c*)	**133.** (*c*)	**134.** (*b*)	**135.** (*b*)	**136.** (*c*)	**137.** (*c*)	**138.** (*b*)	**139.** (*b*)	**140.** (*b*)
141. (*a*)	**142.** (*a*)	**143.** (*d*)	**144.** (*d*)	**145.** (*c*)	**146.** (*d*)	**147.** (*b*)	**148.** (*d*)	**149.** (*c*)	**150.** (*c*)
151. (*c*)	**152.** (*b*)	**153.** (*d*)	**154.** (*c*)	**155.** (*b*)	**156.** (*d*)	**157.** (*c*)	**158.** (*a*)	**159.** (*b*)	**160.** (*b*)
161. (*b*)	**162.** (*d*)	**163.** (*a*)	**164.** (*a*)	**165.** (*d*)	**166.** (*a*)	**167.** (*d*)	**168.** (*c*)	**169.** (*a*)	**170.** (*d*)
171. (*d*)	**172.** (*a*)	**173.** (*c*)	**174.** (*c*)	**175.** (*d*)	**176.** (*d*)	**177.** (*d*)	**178.** (*c*)	**179.** (*a*)	**180.** (*c*)
181. (*d*)	**182.** (*d*)	**183.** (*c*)	**184.** (*c*)	**185.** (*b*)	**186.** (*d*)	**187.** (*d*)	**188.** (*c*)	**189.** (*a*)	**190.** (*d*)
191. (*b*)	**192.** (*a*)	**193.** (*b*)	**194.** (*c*)	**195.** (*b*)	**196.** (*c*)	**197.** (*a*)	**198.** (*b*)	**199.** (*a*)	**200.** (*d*)

Hints and Solutions

SECTION A: GENERAL INTELLIGENCE AND REASONING

1. (*b*) The pattern shows words are arranged alphabetically from left, and numbers in descending order. In each step, one word (alphabetically first among remaining) goes to its position, then one number (largest among remaining) goes to its position. Step 6 would be: ahead 87 base 35 gone 62 49 or.

2. (*b*) From $P \geq Q > R = S$, we get $P > S$ (I true). From $R = S < T \leq U$, we get $U \geq T > S = R$, so $U > R$ (II true). We cannot establish a relation between T and Q (III false).

3. (*a*) Pattern: 3×2+1=7,

7 × 2 + 2 = 16, 16 × 2 + 3

= 35, 35 × 2 + 4 = 74, 74 × 2 + 5 = 153

4. (*b*) First letters:

A (1), C(3), F(6), J(10), O(15)

- differences are 2,3,4,5.

Second letters: Z(26), X(24), U(21), Q(17), L(12) - differences are -2,-3,-4,-5.

5. (*a*) Pattern: 2×3 = 6, 6 × 5 = 30, 30 × 7 = 210, 210 × 11 = 2310, 2310 × 13 = 30030 (multiplying by consecutive prime numbers: 3,5,7,11,13)