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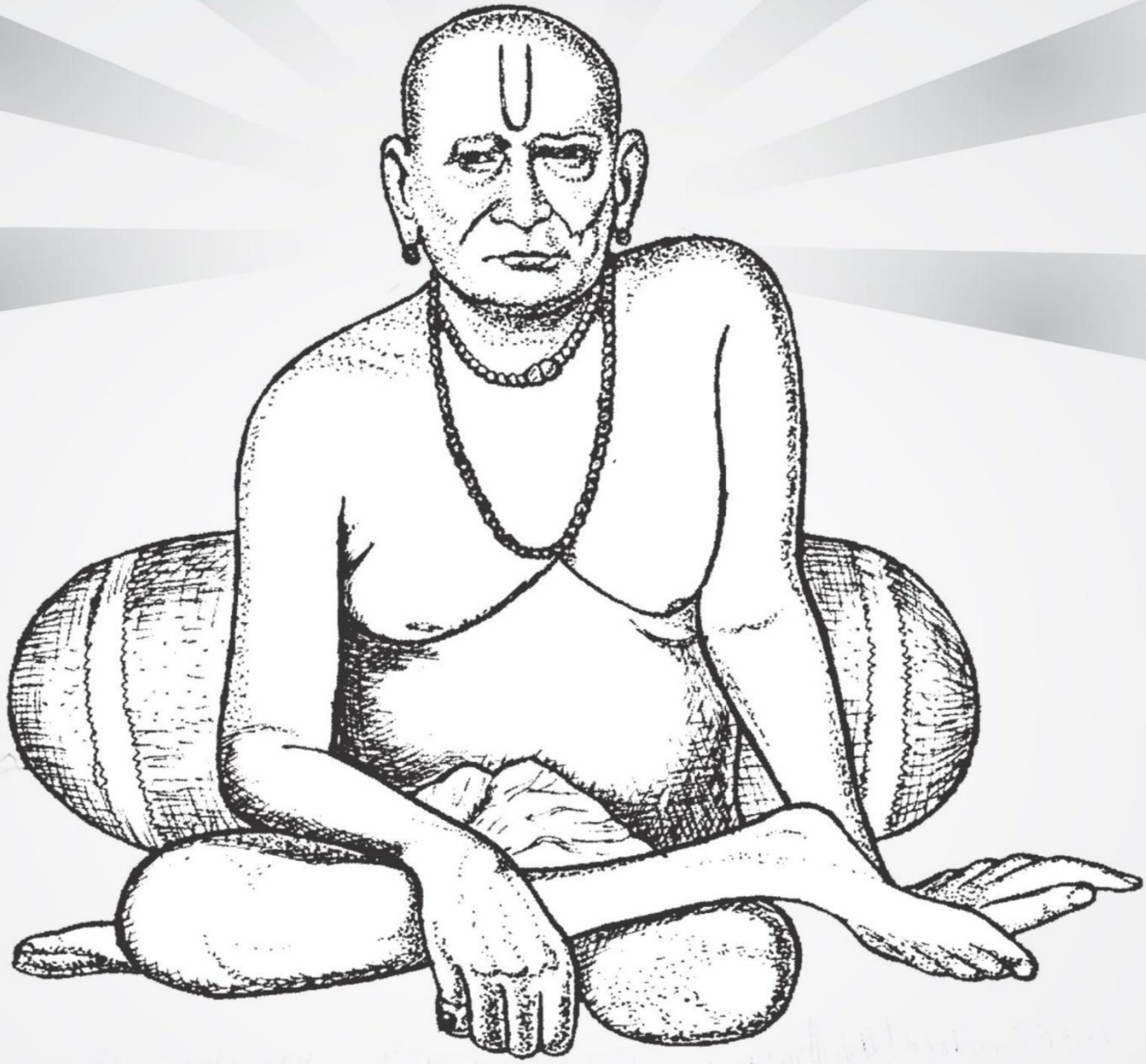

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स्वामींच्या चरणी अर्पण ...

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SURVEYING

QUESTIONS

1.1 INTRODUCTION

1. A station is affected by local attraction if _____
A. there is a magnetic dip
B. the magnetic needle deviates from true north
C. the magnetic needle deviates from magnetic north
D. the magnetic needle does not remain stationary
NMC CEA 2025

2. Which of the following units does a representative fraction have?
A. Decimetre
B. It is independent of units.
C. Centimetre
D. Metre
NMC CEA 2025

3. Isogonic lines _____ .
A. form closed circles with the equator at the centre
B. radiate from the North and South magnetic regions and follow irregular paths
C. form closed circles with the North Pole as the centre
D. form closed spheroidal shapes with the equator at the centre
NMC CEA 2025

4. Which of the following helps in detecting local attraction?
A. Difference in the fore bearing and back bearing of a survey line.
B. Difference in the slope between two stations of a survey line.
C. Difference in the true bearing and magnetic bearing of a survey line.
D. Difference in the elevations of the two points of a survey line.
NMC CEA 2025

5 Which of the following can cause local attraction?
I: Magnetic rock below the ground
II: Rails
III: Field book for noting the observations
A. II and III only B. I and II only
C. III only D. II only
NMC CEA 2025

6. In chain surveying, an offset shall be taken _____
A. Whenever the outline of the object changes
B. Whenever the line deviates from a straight line
C. Whenever one chain length is exceeded
D. Whenever the length exceeds 5 m
NMC CEA 2025

7. The principle of 'working from whole to part' is applicable to:
A. both plane and geodetic surveying
B. only plane surveying
C. only traverse surveying
D. only geodetic surveying
NMC CEA 2025

8. Which of the following errors in chaining can be cumulative positive or negative?
A. Erroneous booking
B. Personal mistakes
C. Careless holding and marking
D. Erroneous length of chain
NMC CEA 2025

9. The biggest main survey line is called the _____ line.
A. tie B. check
C. base D. proof
NMC CEA 2025

10. Which of the following variations of magnetic declination is of periodic nature?
A. Annual variation B. Irregular variation
C. Secular variation D. Diurnal variation
NMC CEA 2025

11. The representative fraction for the engineer's scale 1 cm = 50 m is _____.
A. $\frac{1}{50}$ B. $\frac{1}{500}$ C. $\frac{1}{5}$ D. $\frac{1}{5000}$
NMC CEA 2025

12. Which of the following representative fractions represents the scale 2cm = 40 m' ?
A. $\frac{1}{2000}$ B. $\frac{2}{20}$
C. $\frac{2}{2000}$ D. $\frac{1}{20}$
NMC CEA 2025

13. The value of magnetic dip is_____ at the equator and _____ at the magnetic poles.
A. 0° ; 0° B. 0° ; 90°
C. 90°; 90° D. 45°; 45°
NMC CEA 2025

14. During a chaining operation, the follower calls out _____ to give a warning to the leader to stop.
A. Range B. Stop
C. Pin Down D. Chain

NMC CEA 2025

15. If a scale is represented by ' 1 cm = 10 m' then identify the correct statement from the following?

1.1 cm on plan represents 10 m on ground.

B. The above scale is same as 1mm = 10cm

C. Using the above scale, 12 cm on plan represents 1200 cm on ground.

D. The representative fraction for the above scale is $\frac{1}{10}$

NMC CEA 2025

16. Which of the following statements are true with respect to magnetic and true meridian?

Statement I: Magnetic meridian and true meridian are parallel to each other.

Statement II: The location of magnetic meridian at a place is not constant with time.

Statement III: True meridian is also called as astronomic meridian.

A. Statement I only

B. Statements I and II only

C. Statements I and III only

D. Statements II and III only

NMC CEA 2025

17. True meridian is established through _____ and magnetic meridian through _____ .

A. magnetic compass; astronomical observations

B. astronomical observations; astronomical observations

C. magnetic compass; magnetic compass

D. astronomical observations; direction given by magnetic compass

NMC CEA 2025

18. Which of the following is a fundamental principle of surveying?

A. Work should be conducted from whole to part

B. Surveying work should always start from higher elevations

C. The use of compasses is mandatory in all surveys

D. Surveying should always be conducted using total stations

NMC JE 2025

19. What is the best way to set up a back sight for a new survey?

A. Position the total station on the tripod.

B. Use a prism carrier and tribrach on a tripod.

C. Measure the distance to the reference point.

D. Use a small level to find the position.

NMC JE 2025

20. A. Read the following statements related to geodetic surveying and determine whether they true or false.

S1: The type of surveying in which the shape of the earth is taken into account.

S2: All lines lying in the surface are curved lines and the triangles are spherical triangles.

A. Both S1 and S2 are true

B. Both S1 and S2 are false

C. S1 is true and S2 is false

D. S2 is true and S1 is false

WCD 2024

21. The surveys that are carried out to depict the topography of the mountainous terrain, rivers, water bodies, wooded areas, and other cultural details such as roads, railways, townships, etc., are called…….

A. City surveys

B. Cadastral surveys

C. Engineering surveys

D. Topographical surveys

WCD 2024

22. Geodetic surveying is conducted by the Survey of India department and is carried out over an area exceeding..... .

A. 150 km^2 B. 200 km^2

C. 50 km^2 D. 250 km^2

WCD 2024

23. Which of the fo il owing surveys is conducted to measure the elevation n of points on the ground surface and to determine the contour of the land?

A. Mining survey

B. Topographical survey

C. Hydrographical survey

D. Astronomical survey

WCD 2024

24. Which type of survey is primarily used to establish the relative positions of points on the Earth's surface?

A. Engineering survey

B. Hydrographic survey

C. Topographical survey

D. Geodetic survey

WCD 2024

25. What happens to the RF if the size of the drawing is increased while the actual size of the object remains constant?

A.RF becomes zero B.RF decreases

C.RF remains the same D.RF increases

MH TPA 2024

ANSWER KEY

QUE	ANS	QUE	ANS	QUE	ANS	QUE	ANS	QUE	ANS
1	C	21	D	41	C	61	A	81	B
2	B	22	D	42	A	62	D	82	C
3	B	23	B	43	B	63	C	83	B
4	A	24	D	44	B	64	A	84	C
5	B	25	D	45	A	65	B	85	B
6	A	26	D	46	A	66	D	86	B
7	A	27	D	47	C	67	A	87	A
8	D	28	C	48	C	68	C	88	C
9	C	29	B	49	C	69	D	89	C
10	D	30	B	50	D	70	A	90	C
11	D	31	C	51	A	71	C	91	A
12	A	32	A	52	D	72	B	92	D
13	B	33	A	53	C	73	C	93	C
14	B	34	A	54	A	74	D	94	B
15	A	35	A	55	B	75	C	95	C
16	D	36	A	56	D	76	D	96	A
17	D	37	D	57	D	77	A	97	D
18	A	38	D	58	C	78	B	98	C
19	B	39	A	59	B	79	D	99	C
20	A	40	A	60	A	80	B	100	B

QUE	ANS	QUE	ANS	QUE	ANS
701	D	721	D	741	D
702	B	722	A		
703	B	723	D		
704	A	724	B		
705	D	725	D		
706	A	726	D		
707	D	727	D		
708	C	728	D		
709	A	729	A		
710	C	730	D		
711	B	731	C		
712	B	732	C		
713	C	733	C		
714	A	734	D		
715	A	735	A		
716	A	736	C		
717	C	737	B		
718	C	738	C		
719	A	739	C		
720	D	740	C		

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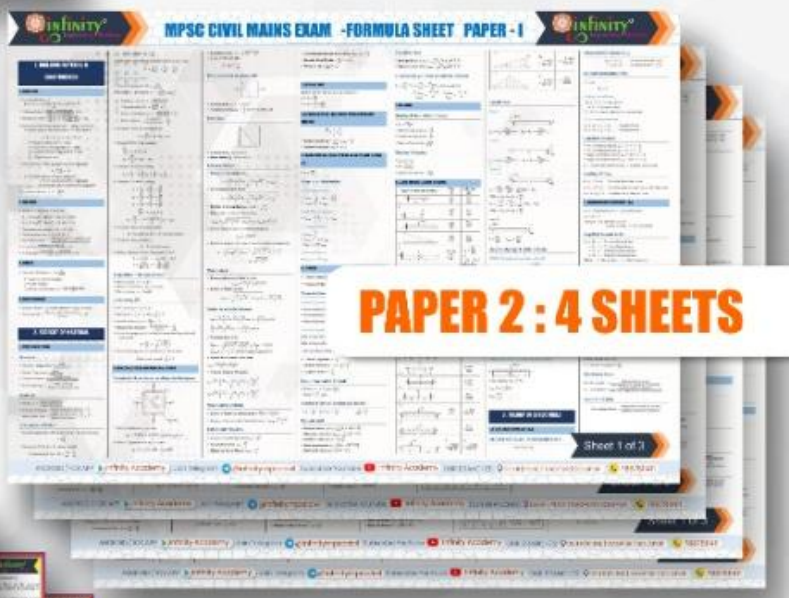

PAPER 2 : 4 SHEETS

6 SHEETS

COVERS ALL
20 SUBJECTS
DEFINITION

14 SHEET COMBO

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EXPLANATIONS

1.1 INTRODUCTION

1. ANSWER :C

A station is affected by local attraction if the magnetic needle deviates from magnetic north.

2. ANSWER :B

A representative fraction is a ratio of two lengths: $\frac{map\ distance}{ground\ distance}$

Both distances are measured in the same units.

The units cancel out.

Therefore, a representative fraction is dimensionless.

3. ANSWER :B

Isogonic lines radiate from the North and South magnetic regions and follow irregular paths.

These lines represent the magnetic declination, which is the angle between magnetic north and true north at a given location.

The Earth's magnetic field is not perfectly aligned with its axis of rotation, causing this declination.

Isogonic lines help navigators and surveyors adjust for this difference when using a magnetic compass.

4. ANSWER :A

The difference in the fore bearing and back bearing of a survey line helps in detecting local attraction.

Local attraction is a phenomenon that affects magnetic compass readings due to local magnetic fields.

Ideally, the difference should be exactly 180 degrees. Any deviation from this indicates the presence of local attraction.

5. ANSWER :B

The correct answer is 2. I and II only. Local attraction, which causes a compass needle to deviate from true magnetic north, can be caused by magnetic rock below the ground and rails. Field books, used for recording observations, are not magnetic and do not cause local attraction.

6. ANSWER :A

Offsets are measured perpendicular (at right angles) from the survey line (chain line) to the object or feature.

This ensures accuracy in locating features relative to the chain line.

Offsets can be perpendicular (normal) or oblique, but the standard practice is to take perpendicular offsets.

7. ANSWER :A

The principle of "working from whole to part" means first estimating the total cost or overall quantities and then breaking them down into individual components.

This approach is typically followed in detailed estimates, where the entire project is considered first, then subdivided.

In contrast, abstracting from parts to whole is used in approximate or preliminary estimates.

8. ANSWER :D

Erroneous booking: This is a recording error, typically random, not cumulative.

Personal mistakes: These can be random and may or may not be cumulative

Careless holding and marking: Usually random and not cumulative.

Erroneous length of chain: This is a systematic error if the chain is longer or shorter than the standard length.

It accumulates positively or negatively over the entire length measured.

9. ANSWER :C

In surveying, the base line is the longest and most important main survey line. It is:

- Laid with great precision.
- Used as a reference for setting out other lines.
- The starting point for triangulation or other types of survey measurements.

10. ANSWER :D

Diurnal variation refers to daily periodic changes in the magnetic declination caused by the Earth's rotation and solar radiation effects.

It is periodic because it repeats every 24 hours.

11. ANSWER :D

Step 1: Convert 50 meters into centimetres (since R.F. is unitless ratio):

$$50m = 50 \times 100 = 5000cm$$

Step 2: the R.F. as a ratio of drawing length to actual length:

$$R.F. = \frac{1cm}{5000cm} = \frac{1}{5000}$$

12. ANSWER :A

Step 1: Convert 40 meters to centimetres:

$$40m = 40 \times 100 = 4000cm$$

Step 2: R.F. as a ratio of drawing length to actual length (both in cm):

ENVIRONMENTAL ENGINEERING

QUESTIONS

11.1 WATER DEMAND AND POPULATION FORECASTING

1. Which dewatering method is suitable for fine grained cohesive soils?
A. Electro-osmosis method
B. Ditches and sumps method
C. Deep well system
D. Shallow well system

NMC CEA 2025

2. Which formula/equation is commonly used to estimate water demand for fire protection?
A. Darcy-Weisbach equation
B. Kuichling's formula
C. Manning's formula
D. Dupuit's equation

NMC JE 2025

3.Compute the fire demand (that is, water required for firefighting) for a city with a population of 1,44,000, by using Kuching's formula.
A. 38,184 litres/min
B. 43,375 litres/min
C. 36,484 litres/min
D. 30,568 litres/min

WCD 2024

4. Which method is commonly used for estimating water demand in residential areas?
A. Per Capita Demand Method
B. Demand Survey Method
C. Statistical Regression Method
D. Water Balance Method

WCD 2024

5. If the number of household members in a family is 5, how much is the total amount of wastewater generated in a day?
(Assume the standard water consumption is 135 litres per capita per day.)
A. 675 litres C. 608 litres
B. 540 litres D. 500 litres

WCD 2024

6. In water supply engineering, the maximum hourly demand of water is equal to:
A. 2.7x (Annual average hourly demand of water)
B. 1.28 x (Annual average monthly demand of water)
C. 1.48 x (Annual average weekly demand of water)
D. 1.8 x (Annual average daily demand of water)

WCD 2024

7. In a rural community with limited access to piped water supply, individual households rely on groundwater sources. When designing a new water supply system for this community, which of the following factors should be prioritised to ensure a sustainable water demand estimation?
A. Historical water usage data from the community, if available
B. Average daily water consumption per household in urban areas
C. Water demand projections based on national population growth trends
D. Design capacity based on the maximum daily water demand

WCD 2024

8 Out of the 150 litres to 200 litres per head per day in residence areas, ……litres per head per day may be taken for flushing requirements and the remaining quantity for other domestic purposes.
A. 25 B. 55
C. 45 D. 35

WCD 2024

9. Which factor is considered while estimating the water demand for commercial establishments?
A. Building height
B. Location of the establishment
C. Occupancy rate
D. Water tariff rates

WCD 2024

10 A developing industrial area has limited historical water consumption data. The industry plans to manufacture pharmaceuticals and textiles. To estimate the water demand for this area, which of the following factors should be given the HIGHEST weightage?
A. Water footprint of similar industries in other locations
B. Daily sunshine hours
C. Climatic conditions of the region
D. Per capita water consumption in nearby residential areas

WCD 2024

11. The Peak Hourly Demand (PHD) for a city is crucial for designing water treatment plants.

ANSWER KEY

QUE	ANS	QUE	ANS	QUE	ANS	QUE	ANS	QUE	ANS
1	A	21	A	41	C	61	C	81	A
2	B	22	A	42	C	62	A	82	B
3	A	23	D	43	A	63	A	83	C
4	A	24	B	44	B	64	D	84	D
5	B	25	A	45	C	65	B	85	B
6	A	26	B	46	D	66	B	86	C
7	A	27	D	47	A	67	B	87	C
8	C	28	B	48	D	68	D	88	D
9	C	29	A	49	B	69	D	89	A
10	A	30	C	50	C	70	A	90	A
11	D	31	A	51	C	71	A	91	A
12	B	32	A	52	B	72	C	92	D
13	A	33	D	53	D	73	D	93	D
14	B	34	C	54	A	74	D	94	C
15	B	35	D	55	D	75	B	95	D
16	C	36	C	56	B	76	B	96	D
17	D	37	D	57	B	77	C	97	A
18	D	38	B	58	C	78	D	98	B
19	C	39	A	59	C	79	C	99	B
20	D	40	B	60	D	80	C	100	D

EXPLANATIONS

11.1 WATER DEMAND & POPULATION FORECASTING

1. ANSWER :A

Fine-grained cohesive soils (like clays) have very low permeability, making conventional methods like wells or sumps ineffective. Electro-osmosis uses an electric current to move water through the soil, which is effective for dewatering such soils.

2. ANSWER : 2

Kuichling's formula is commonly used to estimate water demand for fire protection. The formula is expressed as Q = 3182√P, where Q is the amount of water required in liters per minute, and P is the population in thousands.

Other formulas used for estimating water demand include:

Freeman's formula:

Q = 1136 [P/5 + 10]

Buston's formula:

Q = 5663√P

National Board of Fire Underwriters formula:

varies based on the type of city or building

3. ANSWER :A

Given, P = 144000 = 144 In thousands)

a) Kuchling's formula

Q = 3182 $\sqrt{p}$

Where Q = Amount of water required in liter/minute.

P = Population in thousand

Q = 3182 $\sqrt{144}$ L/min

Q = 38184L/min = 0.636 cumecs

4. ANSWER :A

Method	Suitability	Not Suitable For
Per Capita Demand Method	- Urban areas with stable populations. - Large-scale or preliminary estimation. - Areas with consistent water consumption patterns	- Areas with highly variable water use. Specialized or small populations
Demand Survey Method	- Local or specific areas with varying water use. -When customized, accurate data is needed. - Areas with diverse socio-economic conditions.	- Large populations. - Budget and time constraints
Statistical Regression	- Data-rich areas with historical data. - Medium to large-sized areas or urban areas. - Forecasting future demand.	- Areas with limited or unreliable data. - Rapidly changing water demand.
Water Balance Method	- Integrated water resource management. - Small to medium-sized catchments or ecosystems. - Long-term planning in water-scarce areas	- Lack of detailed data on water sources. - Large urban areas with complex systems.

5. ANSWER :B

Given: Standard water consumption per person per day = 135 litre

No of people = 5

Assuming total water consumed is converted into waste water

Total waste water generated = 135 × 5 = 540 litre

6. ANSWER :A

A) Maximum daily consumption = 1.8 x Avg. daily consumption = 1.8 q

B) Maximum hourly consumption:

This is taken as 150% of its average.

Maximum hourly consumption of maximum daily (Peak Demand) =

[1.8 x $\frac{q}{24}$]= 2.7 $\left(\frac{q}{24}\right)$

LATEST EXAMS CONDUCTED BY TCS UPTO DEC 2025

ANSWER KEY

QUE	ANS	QUE	ANS	QUE	ANS	QUE	ANS	QUE	ANS
1	A	21	A	41	A	61	D	81	A
2	A	22	A	42	C	62	C	82	A
3	B	23	B	43	A	63	A	83	A
4	C	24	B	44	D	64	D	84	B
5	D	25	D	45	B	65	B	85	D
6	B	26	C	46	B	66	D	86	C
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9	C	29	B	49	C	69	D	89	C
10	B	30	D	50	B	70	C	90	D
11	A	31	B	51	C	71	B	91	D
12	B	32	D	52	D	72	C	92	D
13	B	33	C	53	D	73	A	93	A
14	C	34	D	54	A	74	B	94	C
15	B	35	A	55	C	75	D	95	A
16	D	36	C	56	B	76	D	96	D
17	D	37	B	57	A	77	B	97	A
18	C	38	D	58	B	78	D	98	C
19	A	39	C	59	C	79	C	99	A
20	C	40	B	60	D	80	D	100	D

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