Annex

Potential of the Task-Based Learning for the Sustainable Development of Food Technology

Test Recipes[1]

Ingredients

Flour/shreds according to type indication	1000 g (T 550)	100%
Baker's yeast	60 g	6%
Table salt	20 g	2%
Baking agents (see experimental factor)	....g	....%
Water (see below)	....g	....%
Fat (butter)	20 g	2%
Sugar	....g	....%

Framework conditions/material parameters

Room temperature	20 °C
Temperature of flour	....°C
Desired temperature of dough	28 °C
Temperature of liquid to be added	36 °C

[1] According to Horlacher, F. (2015), unpublished lecture notes.

J. Drummer et al. (eds.), *Vocational Teacher Education in Central Asia*, Technical and Vocational Education and Training: Issues, Concerns and Prospects 28, https://doi.org/10.1007/978-3-319-73093-6

Process parameters

Kneading time	Mixing phase: strokes, 80....
	Kneading phase: strokes, 920....
Dough fermentation phase	10 min
Bulk fermentation	30 min
Baking	35 min

Apparatus: spiral kneader
Process- and result-oriented documentation of data

Trial number	1	2	3
Experimental factor (precise description)	*0-trial* comparative sample	*2% baking agent* – emulsifying baking agent (diacetyl tartaric acid)	*5% baking agent* – enzymatically active malt baking agent
Amount of water used for preparation of dough	580 ml	620 ml	620 ml
Dough			
Dough weight calculated	1680 g	1740 g	1770 g
Dough weight yielded	1660 g	1720 g	1750 g
Dough consistency after kneading	Firm, slightly moist, slightly sticky	Firm, drier than **1**	Very soft, viscous, and very sticky
Dough resting time			
Dough temperature reached	28 °C	28 °C	27 °C
Dough resting time	10 min	10 min	10 min
Dough deposit (unit weight)	415 g	430 g	435 g
Unit fermentation			
Unit fermentation	30 min	30 min	30 min
Baking			
Baking time	35 min	35 min	35 min
Particular observations or variances/differences			

Evaluation of data on .....
Basics

Theoretical yield of dough: $\frac{(\text{flour} + \text{water}) \times 100}{\text{flour}}$	Practical yield of dough:	$\frac{(\text{flour} + \text{water} + \text{all ingredients}) \times 100}{\text{flour}}$
Baking loss (BV): dough weight (TE) – wheat product weight (GG)	Baking loss in %:	$\frac{(\text{dough weight} - \text{wheat product weight}) \times 100}{\text{dough weight}}$
Yield of wheat product (GA): $\frac{\text{wheat product weight} \times 100}{\text{amount of flour per wheat product}}$	Volume yield:	$\frac{\text{volume of wheat product} \times 100}{\text{amount of flour per wheat product}}$

Calculations and evaluations regarding the wheat product

Trial number	1	2	3
Amount of flour used per wheat product	250 g	250 g	250 g
Wheat product weight per unit	360 g	360 g	386 g
Baking loss	....%	....%	....%
Yield of wheat product	....%	....%	....%
Volume of wheat product per unit	1150 ml	1400 ml	800 ml
Volume yield			
Shape, appearance			
Browning and crust	Light, firm, normal browning and crust	Dark in the upper section, otherwise smooth and light like **1**	Dark crust, burst-open bubbles
Fluffiness and crumb appearance	Normal pores, evenly distributed	Very light, very fluffy, very fine pore structure	Density, firm pores
Crumb structure	Normal, does not crumble	Very smooth, fluffy, very soft	Slightly agglomerating, nonelastic crumb (press of the thumb remains visible)
Smell and taste	Normal, pleasant, typical	Poor in aroma, slightly yeasty	Off flavours, slightly sweet
Comments			

The Achievement Test (English Version)

Test Instructions

Dear student, read the following instructions carefully:

- This test consists of 60 multiple questions. Each question has four possible answers (A, B, C, and D). You must choose the correct or best answer.
- Calculator is recommended during this test.
- Use an HP pencil to mark in the answer sheet.
- Read each question carefully.
- Try to answer every question.
- Use the answer sheet to answer the test questions.

Example
This test is for the subject of:

(A) Automatic control
(B) Mechanical engineering
(C) Electrical engineering
(D) Drawing engineering

Answer Sheet

- Locate the question number on the separate answer sheet provided, and fill in the circle that corresponds to your choice.
- Now turn this page and answer the questions.

1. An electric machine is used to convert the kinetic energy to the electrical energy in the presence of magnetic field:

   (A) Generator
   (B) Transformer
   (C) Motor
   (D) Battery

2. The uppermost value for the alternating current through a complete cycle is the:

   (A) Average value
   (B) Maximum value
   (C) Instantaneous value
   (D) Root-mean-square value

3. If the maximum value of AC is $10\sqrt{2}$ Ampere, the root-mean-square value of AC will be equal to:

   (A) $\sqrt{2}$ A
   (B) 5 A
   (C) $15\sqrt{2}$ A
   (D) 10 A

4. EMF generated between the poles of an electrical generator is equal to half of its maximum value when the angle of turning the coil is:

   (A) 30°
   (B) 45°
   (C) 60°
   (D) 75°

5. The value of EMF depends on the following factors *except one*:

   (A) Number of turns of coil
   (B) Strength of magnetic field
   (C) Speed of turning coil
   (D) Generator pole type

6. Two wave forms of sine will have the same phase angle if:

   (A) $\Phi_1 - \Phi_2 = 0$
   (B) $\Phi_1 - \Phi_2 < 0$
   (C) $\Phi_1 - \Phi_2 \neq 0$
   (D) $\Phi_1 - \Phi_2 > 0$

7. The value of an alternating voltage is the equivalent DC voltage that can deliver the same amount of energy to a resistor as the AC does over a cycle:

   (A) Maximum value
   (B) Root-mean-square value
   (C) Average value
   (D) Instantaneous value

8. The unit of the electrical frequency is:

   (A) Ampere (A)
   (B) Volt (V)
   (C) Watt (W)
   (D) Hertz (Hz)

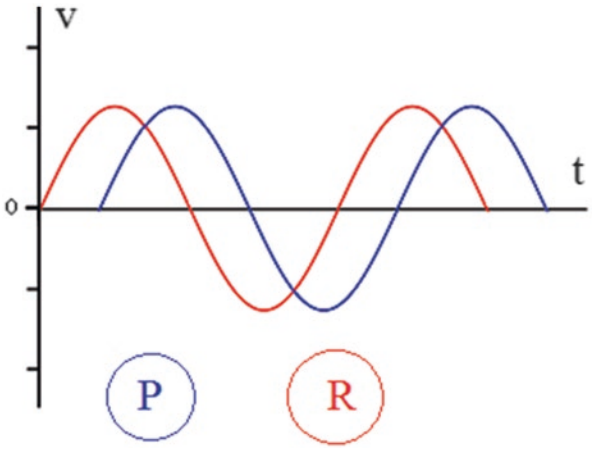
9. If the value of maximum voltage is 100 V, the average voltage value will be equal to:

   (A) 75.3 volt
   (B) 63.7 volt
   (C) 40.3 volt
   (D) 25.7 volt

10. If a device is connected for measuring the current in AC circuit, the reading of this device will be indicated to:

    (A) Current instantaneous value
    (B) Current average value
    (C) Current RMS value
    (D) Current maximum value

11. In the wave form represented below, it could be inferred that:



(A) The wave form P leads the wave form R.
(B) The wave forms R and P have the same phase angle.
(C) P and R wave forms are mirror image of each other.
(D) The wave form R leads wave form P.

12. The form factor of an alternating current is:

(A) Multiplication of the maximum value in the RMS value
(B) The ratio of the RMS value to the average value
(C) Multiplication of the instantaneous value in the RMS value
(D) The ratio of the maximum value to the RMS value

13. An AC voltage is described mathematically by the equation:

(A) $e = E_{max} \sin (\omega + t)$
(B) $e = E_{max} \cos (\omega t)$
(C) $e = E_{max} \sin (\omega t)$
(D) $e = E_{max} \tan (\theta)$

14. The value of EMF in a generator will be equal to zero when the level of coil is:

(A) Making 60° with magnetic field lines
(B) Perpendicular on the magnetic field lines
(C) Making 45° with magnetic field lines
(D) Parallel with magnetic field lines

15. An AC circuit consists of only a capacitor. What is the relationship between current and voltage?

    (A) Current and voltage are in the same phase.
    (B) Current leads voltage.
    (C) Voltage leads current.
    (D) Voltage is a mirror image for current.

16. The unit of the inductive reactance is:

    (A) Farad
    (B) Joule
    (C) Henry
    (D) Tesla

17. An AC circuit contains of a resistance only. If the frequency is increased in the circuit, the resistance value would be:

    (A) Increased also
    (B) Decreased
    (C) Not changed
    (D) Multiplied

18. In an AC circuit including a resistance only, the phase angle between current and voltage is equal to:

    (A) 0 degree
    (B) 45 degree
    (C) 60 degree
    (D) 90 degree

19. The value of inductive reactance of the coil depends on:

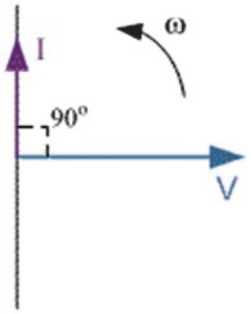
    (A) Frequency and inductance values of the coil
    (B) Inductance and capacitive values of the coil
    (C) Capacitive value of the coil and frequency value
    (D) Number of turns and capacitive value of the coil

20. In the diagram below, what is the current value in this circuit?

    (A) 2 A
    (B) 0.5 A

(C) 15 A
(D) 5 A

21. The diagram below introduces the angle between voltage and current in an AC circuit which contains:

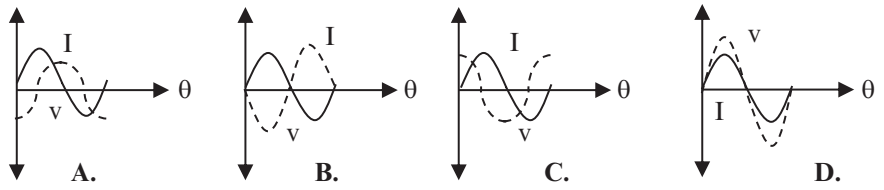


(A) Resistor
(B) Inductor
(C) Transformer
(D) Capacitor

22. When the source frequency increases in an AC circuit, the current value will decrease because the circuit includes:

(A) Resistor
(B) Inductor
(C) Capacitor
(D) Transformer

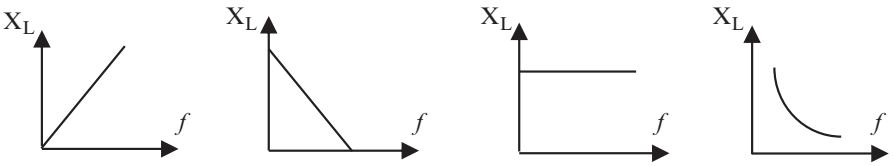
23. One of the following graphs represents the voltage change (V) and the current (I) in a resistive circuit. Which one is it?



24. Terminals of a coil connect to a car battery. In that case, the total resistance of such coil will be equal to:

(A) (R) only
(B) R + (Lω)
(C) (Lω) only
(D) R + 2 Lω

25. An inductor is connected with an AC source. If we increase the frequency from zero gradually, the changes in the inductive reactance are represented by the graph:

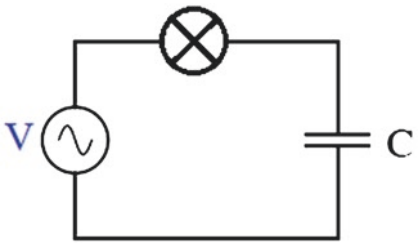


A. **B.** **C.** **D.**

26. An inductor with an iron core is connected with an AC source. When the iron core is withdrawn from the coil, what can happen to the current and frequency?

(A) Frequency fixed and current decreased.
(B) Frequency increased and current increased also.
(C) Frequency decreased and current decreased also.
(D) Frequency fixed and current increased.

27. In the circuit shown below, when the distance between capacitor conductors increases, the lighting of the lamp will:



(A) Increase also
(B) Disappear
(C) Decrease
(D) Not change

28. In the case of connecting two electrical elements in series with an AC source, the total current is equal to the current value in:

(A) First element = current value in the second element
(B) Second element + current value in the first element
(C) First element ÷ current value in the second element
(D) Second element × current value in the first element

29. A pure inductor is connected series with an AC source. If this inductor is replaced by a capacitor, the current flow in the circuit will:

    (A) Increase
    (B) Multiply
    (C) Decrease
    (D) Not change

30. An AC series circuit consists of resistance 3 Ω and inductive reactance 4 Ω. The impedance will be equal to:

    (A) 1 ohm
    (B) 5 ohm
    (C) 7 ohm
    (D) 12 ohm

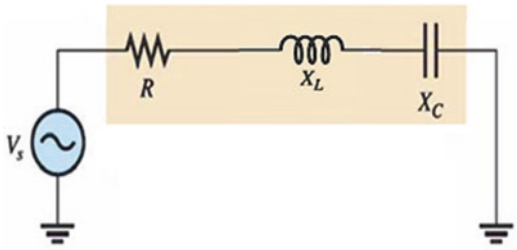
31. When resistors and inductors are connected together in series circuits, the circuit total current will have a phase angle somewhere between:

    (A) 0° and positive 90°
    (B) 90° and negative 120°
    (C) 0° and negative 90°
    (D) 90° and positive 120°

32. An AC series circuit consists of resistor and capacitor. If the voltage drop on each element is equal to 4 V, the total voltage drop in the circuit will be equal to:

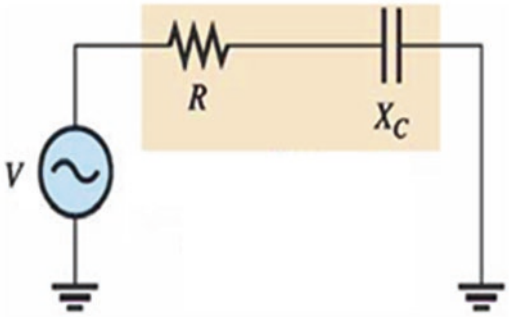
    (A) 1 volt
    (B) 4 volt
    (C) 8 volt
    (D) 16 volt

33. In the diagram shown below, the resistance is 6 Ω, inductive reactance 24 Ω, and capacitive reactance 16 Ω. If the AC source is replaced by the DC source, the total resistance will be equal to:



    (A) Indefinitely
    (B) 10 ohm
    (C) 0 ohm
    (D) 6 ohm

34. In the circuit diagram shown below, the capacitive reactance is 6 Ω, resistance is 5 Ω, and current source is 2 A. The reactive power in this circuit is:



(A) 24 V/A/R
(B) 20 V/A/R
(C) 18 V/A/R
(D) 15 V/A/R

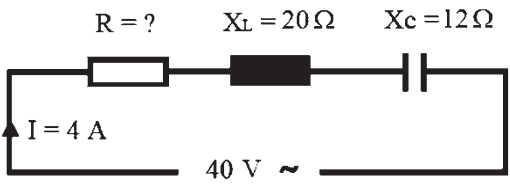
35. In RLC series circuits, when the capacitive reactance is greater than the inductive reactance, it can be concluded that the circuit is:

(A) Inductive and the phase angle negative
(B) Capacitive and the phase angle negative
(C) Inductive and the phase angle positive
(D) Capacitive and phase angle positive

36. In RLC circuits, the true power is in the greatest value when the inductive reactance is:

(A) Less than capacitive reactance value.
(B) Greater than capacitive reactance value.
(C) Equal to capacitive reactance value.
(D) Inductive reactance doesn't affect it.

37. In the circuit diagram introduced below, what is the value of the resistance R?

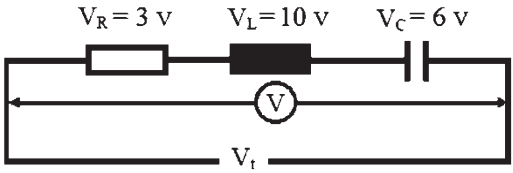


(A) 32
(B) 10
(C) 8
(D) 6

38. Based on the power triangle in AC series circuits, when the phase angle decreases, the true power is:

    (A) Multiplied
    (B) Decreased
    (C) Increased
    (D) Not affected

39. Inductor, resistor, and capacitor are connected in series with an AC source as shown in the diagram. The voltmeter will read:



    (A) 19 volt
    (B) 12 volt
    (C) 5 volt
    (D) 3 volt

40. The current and voltage will have the same phase angle in a parallel RLC circuit when:

    (A) XC = XL
    (B) $R + X_C + X_L = 0$
    (C) $R = X_L$
    (D) $R = X_C$

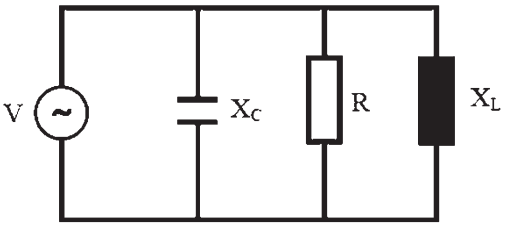
41. Two resistors are connected together in parallel with an AC source. The value of total voltage will be equal to:

    (A) Half drop voltage on the first resistor
    (B) Multiply drop voltage on the second resistor
    (C) Drop voltage on the first resistor
    (D) Half drop voltage on the second resistor

42. Inductor and resistor are connected in parallel with an AC source. The value of the total current:

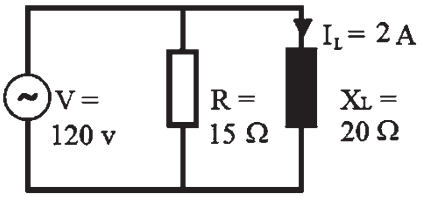
    (A) Lags to voltage by angle Φ
    (B) Lags to voltage by angle 2 Φ
    (C) Leads to voltage by angle Φ
    (D) Leads to voltage by angle 2 Φ

43. In the circuit diagram shown below, if the capacitive reactance is less than the inductive reactance, the voltage drop in this circuit would be:



(A) Lead the current phase angle
(B) Lag the current phase angle
(C) Equal to the current phase angle
(D) Mirror the current phase angle

44. In the circuit diagram shown below, the resistor and the inductor are connected in parallel. The value of the reactive power in this circuit is:



(A) 40 V/A/R
(B) 60 V/A/R
(C) 120 V/A/R
(D) 240 V/A/R

45. From triangle power in a parallel AC circuit, when the cosine angle is the greatest value, it can be concluded that:

(A) True power is equal to apparent power.
(B) Reactive power is equal to apparent power.
(C) True power is equivalent to total power.
(D) True power is equal to reactive power.

46. An AC parallel circuit consists of resistor and capacitor. The current in the resistance is 3 A and the current in capacitance is 4 A. The total current will be equal to:

(A) 1 Ampere
(B) 5 Ampere
(C) 7 Ampere
(D) 12 Ampere

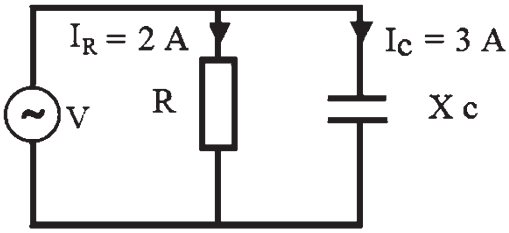
47. Resistor and capacitor are connected in parallel with an AC source. The power factor is 0.5 and the true power is 40 W. So, the apparent power in this circuit is:

    (A) 100 V/A
    (B) 80 V/A
    (C) 40.5 V/A
    (D) 20 V/A

48. An AC circuit consists of resistance and capacitor. The voltage lags to current by angle 45°. It can be concluded that:

    (A) $X_C < R$
    (B) $X_C = R$
    (C) $X_C > R$
    (D) $X_C = 2R$

49. In the circuit diagram represented below, the resistance is 6 Ω. So, the real power in this circuit is:

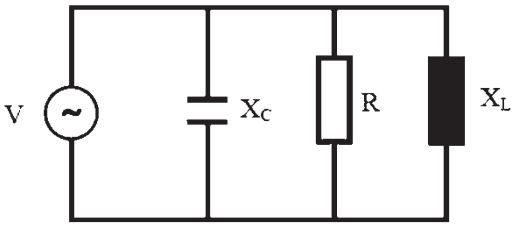


    (A) 8 Watt
    (B) 11 Watt
    (C) 18 Watt
    (D) 24 Watt

50. In a RLC parallel circuit, the total current is 2 Ampere and the power factor is 0.5. The current flow in the resistor is:

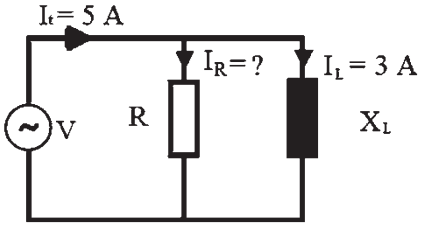
    (A) 1 Ampere
    (B) 1.5 Ampere
    (C) 2.5 Ampere
    (D) 4 Ampere

51. In the diagram shown below, the current flow in the resistance is 4 Ampere, the inductance is 2 Ampere, and the capacitance is 5 Ampere. The total current is:



(A) 1 Ampere
(B) 2 Ampere
(C) 4 Ampere
(D) 5 Ampere

52. In the circuit diagram shown below, the current flow in the resistor R is:



(A) 15 Ampere
(B) 8 Ampere
(C) 6 Ampere
(D) 4 Ampere

53. The resonance frequency in series case is the frequency that happened when the current is:

(A) Minimum value
(B) Equal to zero
(C) Maximum value
(D) Direct

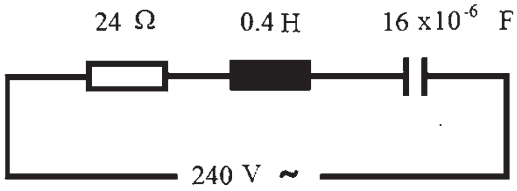
54. In a resonance case, the circuit impedance Z is equal to:

(A) Current I
(B) Resistance R
(C) Inductive reactance XL
(D) Capacitive reactance XC

55. A resonance circuit contains a capacitor 4 μf. If we want to increase the frequency to twice its value, we must replace the capacitor by another equal to:

(A) 1 μf
(B) 2 μf
(C) 8 μf
(D) 16 μf

56. The circuit diagram shown below is a resonant circuit. The total current in this circuit is:

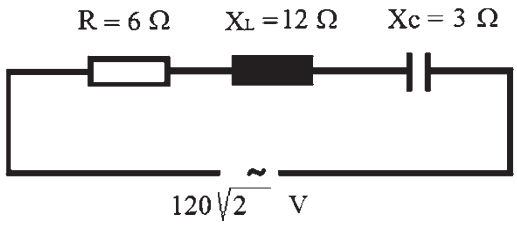


(A) 6 Ampere
(B) 10 Ampere
(C) 15 Ampere
(D) 30 Ampere

57. A resonant circuit consists of capacitor and inductor. If we put insulation between the capacitor conductors, the circuit resistance will:

(A) Decrease and current increase
(B) Increase and current also
(C) Decrease and current also
(D) Increase and current decrease

58. The circuit diagram shown below is a resonant circuit. The total current in this circuit is:



(A) $10\sqrt{2}$
(B) 20
(C) $20\sqrt{2}$
(D) $40\sqrt{2}$

59. The amplifier quantity in parallel resonant circuit is:

(A) Impedance
(B) Voltage
(C) Current
(D) Resistor

60. A resonance circuit consists of inductor and capacitor. The reactive power is:

(A) Equal to true power
(B) Minimum value
(C) Equal to zero
(D) Maximum value

End of the Test

Answer Sheet

Name: ……..……Date: ……

1.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
2.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
3.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
4.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
6.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
7.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
8.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
9.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
10.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
11.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
31.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
32.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
33.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
34.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
35.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
36.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
37.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
38.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
39.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
40.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
41.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	

20.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
21.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
22.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
23.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
24.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
50.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
51.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
52.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
53.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	
54.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	

25.	Ⓐ Ⓑ Ⓒ Ⓓ	55.	Ⓐ Ⓑ Ⓒ Ⓓ
26.	Ⓐ Ⓑ Ⓒ Ⓓ	56.	Ⓐ Ⓑ Ⓒ Ⓓ
27.	Ⓐ Ⓑ Ⓒ Ⓓ	57.	Ⓐ Ⓑ Ⓒ Ⓓ
28.	Ⓐ Ⓑ Ⓒ Ⓓ	58.	Ⓐ Ⓑ Ⓒ Ⓓ
29.	Ⓐ Ⓑ Ⓒ Ⓓ	59.	Ⓐ Ⓑ Ⓒ Ⓓ
30.	Ⓐ Ⓑ Ⓒ Ⓓ	60.	Ⓐ Ⓑ Ⓒ Ⓓ