

FIITJEE SAMPLE PAPER – 2018

(Big Bang Edge Test / Talent Recognition Exam)

for students presently in

Class 10 (Paper 2)

Time: 3 Hours (1:45 pm – 4:45 pm)

Code 1010

Maximum Marks: 270

Instructions:

Caution: Class, Paper, Code as given above MUST be correctly marked in the answer OMR sheet before attempting the paper. Wrong Class, Paper or Code will give wrong results.

1. This Question paper consists of 3 sections. All questions will be multiple choice single correct out of four choices with marking scheme in table below:

Section – I, II & III (PCM)	Question no.	Marking Scheme for each question	
		correct answer	wrong answer
PHYSICS	1 to 2, 6, 31 to 32, 38, 61	+3	-1
	3 to 4, 7 to 9, 33 to 36, 39, 62	+4	-1
	5, 10, 37, 40, 63	+5	-2
CHEMISTRY	11 to 12, 16, 41 to 42, 48, 64	+3	-1
	13 to 14, 17 to 19, 43 to 46, 49, 65	+4	-1
	15, 20, 47, 50, 66	+5	-2
MATHEMATICS	21 to 22, 26, 51 to 52, 58, 67	+3	-1
	23 to 24, 27 to 29, 53 to 56, 59, 68	+4	-1
	25, 30, 57, 60, 69	+5	-2

2. Answers have to be marked on the OMR sheet. The Question Paper contains blank spaces for your rough work. No additional sheets will be provided for rough work.
3. Blank papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.
4. **Before attempting paper write your OMR Answer Sheet No., Registration Number, Name and Test Centre** in the space provided at the bottom of this sheet.
5. **See method of marking of bobbles of the back of cover page for question no. 31 to 69.**

Note: Please check this Question Paper contains all **69** questions in serial order. If not so, exchange for the correct Question Paper.

OMR Answer Sheet No. : _____

Registration Number : _____

Name of the Candidate : _____

Test Centre : _____

For questions **31 to 60**

Numerical based questions single digit answer 0 to 9

Example 1:

If answer is 6.

Correct method:

- 0 1 2 3 4 5 6 7 8 9

Example 2:

If answer is 2.

Correct method:

- 0 1 2 3 4 5 6 7 8 9

For questions **61 to 69**

Numerical answer type questions with answer XXXXX. XX

Correct bubbles to be darkened below the boxes for your answer.

If answer is 348.4 / 251.37 / 213

Correct Method :

		3	4	8	.	4	0
		2	5	1	.	3	7
		2	1	3	.	0	0

Wrong Method :

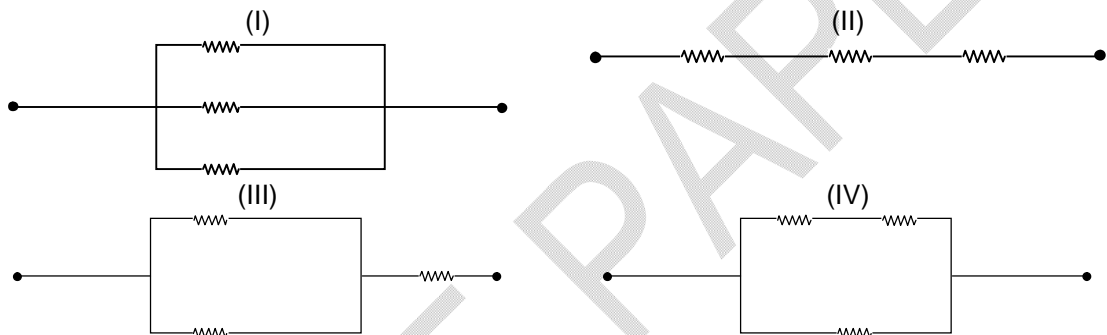
	3	4	8		.	4	
3	4	8			.		4
		3	4	8	.		4
	3		4	8	.	4	
	2		5	1	.	3	7
		2	1	3	.		

Section-I**Science & Mathematics****Physics****(Part - A)****Straight Objective Type**

Question numbers 1 to 2 are 2 passage based Multiple Choice Questions. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

We know that power dissipated in the circuit is related to current and resistance as $P = I^2 R$ and in terms of voltage and current, $P = VI$ then:-

1. Arrange the power dissipated in following circuits in order if same current is passing through all circuits & each resistor is 'R', if P_1, P_2, P_3 and P_4 are the power dissipated in the given circuit:-



- (A) $P_2 > P_3 > P_4 > P_1$
 (B) $P_3 > P_2 > P_4 > P_1$
 (C) $P_4 > P_3 > P_2 > P_1$
 (D) $P_1 > P_2 > P_3 > P_4$
2. What will be the percentage increase in power across each circuit if the current is increased by 2%?
 (A) 4%
 (B) 4.4 %
 (C) 4.04 %
 (D) None of these

Space for Rough Work

Straight Objective Type

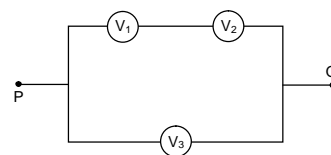
Question numbers 3 to 5 are 3 multiple choice questions single correct. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

3. Boiling water reactor and pressurised water reactors are:
 (A) Nuclear reactor (B) Solar reactor
 (C) OTEC (D) Biogas reactor
4. Which of the following is an example of fossil fuel?
 (A) Coal gas (B) Coke
 (C) Natural gas (D) Producer gas
5. Destructive distillation of coal leads to the formation of
 (A) wood (B) kerosene
 (C) ammoniacal liquor (D) charcoal

Straight Objective Type

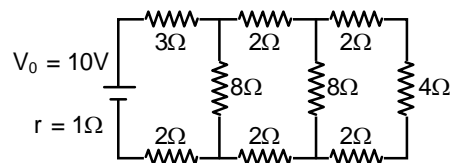
Question numbers 6 to 10 are 5 multiple choice questions multi correct. Each question has 4 choices (A), (B), (C) and (D), out of which **ONE or More** is correct.

6. Three voltmeters, all having different resistances are joined as shown in figure. When same potential difference is applied across P and Q, their readings are V_1 , V_2 and V_3 respectively. Then



- (A) $V_1 = V_2$ (B) $V_1 \neq V_2$
 (C) $V_1 + V_2 = V_3$ (D) $V_1 + V_2 > V_3$

7. In the circuit shown in figure, the cell has emf = 10 V and internal resistance = 1 Ω

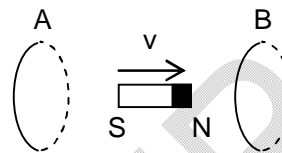


- (A) the current through the 3 Ω resistor is 1 amp
 (B) the current through the 3 Ω resistor is 0.5 amp
 (C) the current through the 4 Ω resistor is 0.5 amp
 (D) the current through the 4 Ω resistor is 0.25 amp

Space for Rough Work

8. Which of the following statement(s) are correct
- (A) Field inside an infinitely long solenoid is constant
 - (B) Field lines inside a bar magnet are parallel straight line
 - (C) Field strength is maximum at the poles of a bar magnet
 - (D) Field outside a long current carrying wire is proportional to r^{-2}

9. A bar magnet is moved between two parallel circular loops A and B with a constant velocity v as shown in the figure.
(Seen from outside)



- (A) The current in each loop flows in the same direction
 - (B) The current in each loop flows in the opposite direction
 - (C) The loops will repel each other
 - (D) The loops will attract each other
10. Consider the magnetic field produced by an infinitely long current carrying wire.
- (A) The lines of force will be concentric circles with centres on the wire.
 - (B) There can be two points in the same plane where magnitude of magnetic fields are same.
 - (C) There can be large number of points where the magnetic field is same.
 - (D) The magnetic field at a point is inversely proportional to the distance of the point from the wire.

Space for Rough Work

Chemistry**(Part – B)****Straight Objective Type**

Question numbers 11 to 12 are 2 passage based questions Multiple Choice Questions. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

According to Bronsted concept acid is proton donor while base is proton acceptor. According to Lewis an acid is electron deficient and electron acceptor while a base is electron efficient and electron donor. The acidic strength depends upon electro negativity difference, oxidation number etc.

11. From the following chemical reactions determine the relative Bronsted – Lowry acid strengths (strongest to weakest).
 $\text{HClO}_4(\text{sol}) + \text{CH}_3\text{COOH}(\text{l}) \longrightarrow \text{CH}_3\text{C}(\text{OH})_2^+(\text{sol}) + \text{ClO}_4^-(\text{aq})$
 $\text{H}_2\text{SO}_4(\text{sol}) + \text{CH}_3\text{COOH}(\text{l}) \rightleftharpoons \text{CH}_3\text{C}(\text{OH})_2^+(\text{sol}) + \text{HSO}_4^-(\text{sol})$
 (A) $\text{HClO}_4 > \text{CH}_3\text{C}(\text{OH})_2^+ > \text{H}_2\text{SO}_4$ (B) $\text{HClO}_4 > \text{CH}_3\text{COOH} > \text{H}_2\text{SO}_4$
 (C) $\text{HClO}_4 > \text{H}_2\text{SO}_4 > \text{CH}_3\text{C}(\text{OH})_2^+$ (D) $\text{HClO}_4 > \text{H}_2\text{SO}_4 > \text{CH}_3\text{COOH}$
12. For Cu^{2+} and CO_2 , which will behave as a Lewis acid toward OH^- in water?
 (A) Only CO_2 (B) Only Cu^{2+}
 (C) Neither Cu^{2+} nor CO_2 (D) Both Cu^{2+} and CO_2

Straight Objective Type

Question numbers 13 to 15 are 3 multiple choice questions single correct. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

13. What would be the weight of the slaked lime required to decompose 8.0 g of ammonium chloride?
 (A) 5.53 g (B) 2.12 g
 (C) 15.52 g (D) 7.62 g
14. Which of the following represents hydrolysis?
 (A) $\text{HCO}_3^- + \text{H}_2\text{O} \rightleftharpoons \text{CO}_3^{2-} + \text{H}_3\text{O}^+$ (B) $\text{HCO}_3^- + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 + \text{OH}^-$
 (C) $\text{H}_3\text{BO}_3 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{BO}_3^- + \text{H}_3\text{O}^+$ (D) $\text{H}_2\text{PO}_4^- + \text{H}_2\text{O} \rightleftharpoons \text{HPO}_4^{2-} + \text{H}_3\text{O}^+$
15. In the ionic equation:
 $x\text{CH}_3\text{CH}_2\text{OH} + y\text{I}_2 + z\text{OH}^- \longrightarrow \text{CHI}_3 + \text{HCO}_2^- + \text{I}^- + \text{H}_2\text{O}$
 (A) $x = 1, y = 4, z = 6$ (B) $x = 1, y = 6, z = 4$
 (C) $x = 1, y = 8, z = 12$ (D) $x = 1, y = 8, z = 8$

Space for Rough Work

Straight Objective Type

Question numbers 16 to 20 are 5 multiple choice questions multi correct. Each question has 4 choices (A), (B), (C) and (D), out of which **ONE or More** is correct.

16. Which of the following salt solutions will be basic?
(A) NaCl (B) NaCN
(C) K_2CO_3 (D) NH_4NO_3
17. Which of the following species can act as a Bronsted base as well as a Lewis base?
(A) NO_3^- (B) CN^-
(C) NH_3 (D) BF_3
18. Metallurgy involves steps :
(A) Concentration of ore (B) Reduction of ore
(C) Purification (D) Alloy formation
19. Identify the ionic compound among the following
(A) NaCl (B) KCl
(C) $MgCl_2$ (D) $AlCl_3$
20. Which of the following is NOT a transition metal
(A) S (B) Ti
(C) Ca (D) Cu
-

Space for Rough Work

Mathematics

(Part - C)

Straight Objective Type

Question numbers 21 to 22 are 2 passage based questions Multiple Choice Questions. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

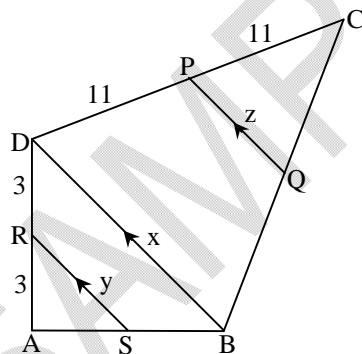
If $x + 2$ is a factor of $x^2 + ax + 2b$ and $a + b = 4$, then

21. The value of 'a' is equal to:
 (A) 1 (B) 3
 (C) -1 (D) 5
22. The value of 'b' is equal to:
 (A) 3 (B) 1
 (C) 5 (D) -1

Straight Objective Type

Question numbers 23 to 25 are 3 multiple choice questions single correct. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

23. In a right triangle ABC right-angled at B, if P and Q are points on the sides AB and BC respectively, then
 (A) $AQ^2 + CP^2 = 2(AC^2 + PQ^2)$ (B) $2(AQ^2 + CP^2) = AC^2 + PQ^2$
 (C) $AQ^2 + CP^2 = AC^2 + PQ^2$ (D) $AQ + CP = \frac{1}{2}(AC + PQ)$.
24. In the figure, $RS \parallel DB \parallel PQ$. If $CP = PD = 11\text{cm}$ and $DR = RA = 3\text{cm}$. Then the values of x, y and z can be



- (A) 12, 10, 12 (B) 14, 6, 6
 (C) 10, 7, 10 (D) 16, 8, 8

Space for Rough Work

25. If $3 \cos \theta = 5 \sin \theta$, then the value of $\frac{5 \sin \theta - 2 \sec^3 \theta + 2 \cos \theta}{5 \sin \theta + 2 \sec^3 \theta - 2 \cos \theta}$ is
- (A) $\frac{271}{979}$ (B) $\frac{316}{2937}$
 (C) $\frac{542}{2937}$ (D) None of these

Straight Objective Type

Question numbers 26 to 30 are 5 multiple choice questions multi correct. Each question has 4 choices (A), (B), (C) and (D), out of which **ONE or More** is correct.

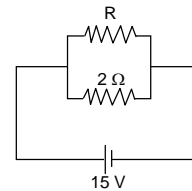
26. If $(a^2 + c^2)x^2 + 2(ab + cd)x + b^2 + d^2 = 0$ has equal roots, then
- (A) $ad = bc$ (B) $\frac{b}{c} = \frac{d}{a}$
 (C) $ab = cd$ (D) $\frac{d}{c} = \frac{b}{a}$
27. ABC is an isosceles right triangle $\angle B = 90^\circ$. Similar triangles ACD and ABE are constructed on sides AC and AB. The ratio between the areas of $\triangle ABE$ and $\triangle ACD$ is
- (A) 1 : 2 (B) $AB^2 : AC^2$
 (C) AB : AC (D) 2 : 1
28. If $\sin x + \cos x = \sqrt{y + \frac{1}{y}}$, $x \in [0, 6\pi]$ and $y > 0$, then
- (A) $x = \frac{\pi}{4}$ (B) $x = \frac{5\pi}{4}$
 (C) $x = \frac{9\pi}{4}$ (D) $x = \frac{13\pi}{8}$
29. The system of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ have solution if
- (A) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ (B) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$
 (C) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (D) none of these
30. The line $x - y = 3$ passes through
- (A) 1st quadrant (B) 2nd quadrant
 (C) 3rd quadrant (D) 4th quadrant

Space for Rough Work

Section-II**Physics, Chemistry & Mathematics****Physics****(Part - A)****Numerical Based Questions**

Question numbers 31 to 40 are 10 Physics contains 3 numerical based questions single digit answer 0 to 9.

31. A wire of resistance 12 ohm is bent in the form a circle. Find the effective resistance (in ohm) between two points on the diametrically opposite sides ?
32. A heater at 220 V boils a volume of water in 5 minute time. If the heater is operated at 110V, the same volume of water will boil in 10n minute. Find the value of n ?
33. Three identical bulbs are connected in series and these together dissipate a power P. If now the bulbs are connected in parallel, then the power dissipated will be nP. Find the value of n.
34. An electric kettle has two coils. When one of these is switched on, the water in the kettle boils in 6 minutes. When the other coil is switched on, the water boils in 3 minutes. If the two coils are connected in series, find the time taken (in minute) to boil the water in the kettle.
35. When two identical batteries of internal resistance 1Ω each (having polarity in same direction) are connected in series across a resistor R, the rate of heat produced in R is P_1 . When the same batteries(having polarity in same direction) are connected in parallel across R, the rate is P_2 . If $P_1 = 2.25 P_2$ then find the value of R in ohm
36. If in the given circuit, power dissipation is 150 W, then find the value of R (in Ω) ?



37. A proton and an electron with same momentum, enter a magnetic field in a direction at right angles to the lines of force. If the ratio of their circular paths are r_p and r_e respectively, then the value of $r_p : r_e$ is found to be $m : 1$. Find the value of m.

Space for Rough Work

38. An electron is moving along x – axis in x – y plane with velocity of 10^2 m/s. A magnetic field of magnitude 10 T is present in the region along z – axis. If the magnitude of force on the particle is $1.6 \text{ m} \times 10^{-16}$ N, find m.
39. A beam of ions with velocity 2×10^5 m/s enters normally into a uniform magnetic field of 0.04T. If the specific charge of ion $\left(\frac{q}{m} = 5 \times 10^6 \text{ C/kg}\right)$. Find the radius (in metre) of the circular path.
40. A current of 3A is flowing in a linear conductor having a length of 40 cm. The conductor is placed in a magnetic field of strength 500 gauss and makes an angle of 30° with the direction of the field. It experience a force of magnitude $m \times 10^{-2}$ N. Find the value of m

Space for Rough Work

Chemistry**(Part - B)****Numerical Based Questions**

Question numbers 41 to 50 are 5 numerical based questions single digit answer 0 to 9.

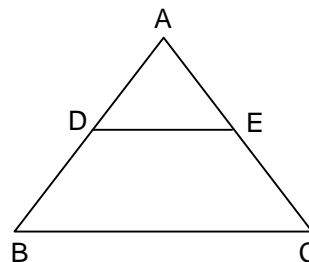
41. Number of soluble salts among the following are : AgCl, PbCl₂, NaNO₃, Ca(OH)₂, BaS.
42. The total number of amphoteric oxides and hydroxides among the following is
Na₂O CaO Al(OH)₃ Pb(OH)₂
SnO ZnO Ca(OH)₂ Fe(OH)₃
43. What is the basicity of H₃PO₃ acid?
44. The differences in the oxidation number of the two types of sulphur atoms present in Na₂S₄O₆ (Hint : sulphur – sulphur linkages present) is:
45. What is the number of water molecules of crystallization present in dolomite ore.
46. What is the valency of iron present in haematite ore.
47. Identify copper minerals from the following:
Chalcopyrite, Cuprite, Siderite, Malachite, Galena, Cinnabar, Chalcocite.
48. Which among the following alloys contain copper as one of the constituents:
German silver, Alnico, Nichrome, Duralumin, Magnalium
49. Identify the ores which are roasted during metallurgy:
Galena, Cinnabar, Cuprite, Argentite, Siderite
50. How many metals can be extracted from carnalite.

Space for Rough Work

Mathematics**(Part - C)****Numerical Based Questions**

Question numbers 51 to 60 are 10 numerical based questions single digit answer 0 to 9.

51. $\frac{\cot \theta}{\cot \theta - \cot 3\theta} + \frac{\tan \theta}{\tan \theta - \tan 3\theta}$ is equal to
52. If a and b can take values 1,2,3,4. Then the number of the equations of the form $ax^2 + bx + 1 = 0$ having real roots is
53. The values of a for which the following system of equations has infinitely many solutions $(2a - 1)x - 3y = 5$, $3x + (b - 2)y = 3$ are
54. If the polynomials $ax^3 + 4x^2 + 3x - 4$ and $x^3 - 4x + a$ leave the same remainder when divided by $(x - 3)$, the value of 'a' is
55. If α, β are the zeroes of the polynomial $f(x) = x^2 - p(x + 1) - c$, then $(\alpha + 1)(\beta + 1) + c$ is equal to:
56. If $\tan \theta = \frac{12}{5}$, then the value of $13(\sin \theta - \cos \theta)$ is
57. The value of $\sin (45^\circ + \theta) - \cos (45^\circ - \theta)$ is equal to
58. If $\sin x = \cos^2 x$, then $\cos^2 x(1 + \cos^2 x)$ is equal to
59. In the figure, if $\text{ar}(\triangle ABC) = 25 \text{ cm}^2$, $DE \parallel BC$ and $AD : DB = 2 : 3$, then $\text{ar}(\triangle ADE)$ is equal to:



60. If $\triangle ABC$ and $\triangle DEF$ are similar such that $2AB = DE$ and $BC = 8\text{cm}$, then $\frac{EF}{BC}$ is equal to:

Space for Rough Work

Section-III **Physics, Chemistry & Mathematics**

Physics

(Part - A)

Numerical Answer Type

Question numbers 61 to 63 are 3 numerical answer type questions with answer **XXXXX.XX**.

61. A piece of wire of resistance $16\text{ k}\Omega$ is cut into four equal parts and all the pieces are connected in parallel to each other. The new combination (parallel) of resistor is equal to $10\text{ n}\Omega$. What is the value of n ?
62. What current (in ampere) must flow in a circular coil of 20 loops of radius 40 cm to produce a magnetic field of $3\pi \times 10^{-2}\text{ T}$ at its center?
63. A proton is projected with a speed of $3 \times 10^6\text{ m/s}$ horizontally from east to west. A uniform magnetic field 'B' of strength $2 \times 10^{-3}\text{ T}$ exists in the vertically upward direction the magnitude of magnetic force on proton is $F \times 10^{-16}\text{ N}$. What is the value of F ?
-

Space for Rough Work

Chemistry**(Part – B)****Numerical Answer Type**

Question numbers 64 to 66 are 3 numerical answer type questions with answer **XXXXX.XX**.

64. Calculate the pH of a solution which contains 9.9 ml of 1 M HCl and 100 ml of 0.1 M NaOH.
65. Calculate the pH of a solution obtained by mixing 0.1 litre of pH = 4 and 0.2 litre of pH = 10.
66. Calculate the pH of solution obtained by mixing 10 ml of 0.1 M HCl and 40 ml of 0.2 M H₂SO₄.

Space for Rough Work

Mathematics**(Part – C)****Numerical Answer Type**

Question numbers 67 to 69 are 3 numerical answer questions with answer **XXXXX.XX**.

67. $\frac{2}{x-2} + \frac{4}{x-3} = \frac{6}{x-1}$, $x \in \mathbb{R}$, $x \neq 1$, $x \neq 2$, $x \neq 3$, then x is equal to

68. If $x - \frac{1}{x} = 2$, then the value of $x^4 + \frac{1}{x^4}$ is

69. If A lies in II quadrant and $3 \tan A + 4 = 0$, then value of $2 \cot A - 5 \cos A + \sin A$ is equal to

Space for Rough Work

FIITJEE SAMPLE PAPER – 2018

(Big Bang Edge Test / Talent Recognition Exam)

for students presently in

Class 10

ANSWERS

Paper 2

- | | | | |
|-------------------------------------|--------------------------------|--------------|----------|
| 1. A | 2. C | 3. A | 4. C |
| 5. C | 6. B,C | 7. A, D | 8. A,B,C |
| 9. B,C | 10. A,B,C,D | 11. A | 12. D |
| 13. A | 14. B | 15. A | 16. B, C |
| 17. A, B, C | 18. A, B, C | 19. A, B, C | 20. A, C |
| 21. B | 22. B | 23. C | 24. D |
| 25. A | 26. A, D | 27. A, B | 28. A, C |
| 29. A, C | 30. A, C, D | 31. 3 | 32. 2 |
| 33. 9 | 34. 9 | 35. 4 | 36. 6 |
| 37. 1 | 38. 1 | 39. 1 | 40. 3 |
| 41. 3 | 42. 4 | 43. 2 | 44. 5 |
| 45. 0 | 46. 3 | 47. 4 | 48. 2 |
| 49. 3 | 50. 2 | 51. 1 | 52. 7 |
| 53. 3 | 54. 1 | 55. 1 | 56. 7 |
| 57. 0 | 58. 1 | 59. 4 | 60. 2 |
| 61. 00100.00 | 62. 03000.00 | 63. 00009.60 | |
| 64. Range pH = 00010.55 to 00010.95 | 65. Range 00009.50 to 00009.52 | | |
| 66. Range 00000.46 to 00000.47 | 67. 00002.20 | 68. 00034.00 | |
| 69. 00002.30 | | | |