1

1. Determine final gas recovery factor and gas cumulative production if the relationship between annual and total gas production has the form $\frac{Q_{річн}}{Q_{зап}} = 3{,}34 - 0{,}02\frac{Q_{сум}}{Q_{зап}}$, % Initial gas reserves equal $50 \cdot 10^6$ m^3.

2. Specify initial gas reserves that developed in gas drive if: reservoir temperature - 70°C, gas gravity – 0.59.

P_{init} MPa	30.6	29.7	28.5	26	25.2	24.3	23	22	21.1	20.4
Q(t) 10^6 m^3	1.1	2.5	4.2	6	7.7	8.5	9.5	10.7	11.6	12.4

2

1. Determine current gas recovery factor of gas deposit on gas drive for the data: gas productive area - $6 \cdot 10^8$ m^2, efficient gas-saturated reservoir thickness - 15 m, initial gas saturation - 0.75, open porosity coefficient - 0.15, initial reservoir pressure - 37 MPa, reservoir temperature - 80 ° C, gas gravity - 0.6, gas cumulative production from the field - $65 \cdot 10^9$ m^3.

2. Determine current gas recovery factor and final gas recovery factor deposit on gas drive the method of average production for the data:

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
$Q(t) \cdot 10^6 m^3$	1	2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3
$Q_{prod}(t)$ $10^6 m^3$	1	3	6	10	15	21	28	36	45	55	64	72	79	85	90	94	97

Initial gas reserves in gas field - $160 \cdot 10^6 m^3$.

3

1. Determine current gas recovery factor for the gas field, which is developing in the gas drive for the following data: initial reservoir pressure is 42 MPa, the current reservoir pressure - 18MPa, reservoir temperature - 86°C, gas gravity - 0.6.

2. Determine current gas recovery factor and final gas recovery factor deposit on gas drive the method of straight line for the data:

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
$Q(t) \cdot 10^6 m^3$	1	2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3
$Q_{prod}(t)$ $10^6 m^3$	1	3	6	10	15	21	28	36	45	55	64	72	79	85	90	94	97

Initial gas reserves in gas field - $135 \cdot 10^6 m^3$.

4

1. Determine initial gas reserves in gas field with reservoir radius 950m, initial gas saturation 0.8, effective porosity - 0.16, reservoir thickness 25m, initial reservoir pressure 30MPa, reservoir temperature 68 ^{0}C, and gas gravity 0.6.

2. Determine current gas recovery factor and final gas recovery factor deposit on gas drive the method of average production for the data:

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
$Q(t)\cdot10^6m^3$	1	2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3
$Q_{prod}(t)$ 10^6m^3	1	3	6	10	15	21	28	36	45	55	64	72	79	85	90	94	97

Initial gas reserves in gas field - $148\cdot10^6m^3$.

5

1. Determine the initial gas reserves in the field according to the data of its development and current gas recovery factor, if cumulative gas production $50\cdot10^9$ m^3, and the dependence of the reduced reservoir pressure (y) on cumulative gas production (x) is described by the equation: $30\text{-}0{,}65\cdot Q_{cum}$; P, MPa; Q_{cum}, 10^9 m^3.

2. Determine current gas recovery factor and final gas recovery factor deposit on gas drive the method of of straight line for the data:

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
$Q(t)\cdot10^6m^3$	1	2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3
$Q_{prod}(t)$ 10^6m^3	1	3	6	10	15	21	28	36	45	55	64	72	79	85	90	94	97

Initial gas reserves in gas field - $137\cdot10^6m^3$.

6

1. Gas reservoir is developing in gas drive. The dependence of the average reduced reservoir pressure described by the equation $\frac{P}{z}=25\text{-}0{,}6\ Q_{cum}$; (P, MPa, Q_{cum} 10^9 m^3). Determine the initial gas reserves and the current gas recovery factor after reservoir pressure reduction by 30% from the initial pressure if the initial reservoir pressure 37 MPa, reservoir temperature 70°C, gas gravity - 0.61.

2. Specify initial gas reserves that developed in gas drive if: reservoir temperature - 50°C, gas gravity – 0.58.

P_{init} MPa	30.4	29.2	28.8	27	25.7	24	23.1	22	21.2	20.4
Q(t) 10^6 m	1.7	2.7	4.7	6.7	7.7	8.7	9.7	10.7	11.7	12.7

7

1. Determine final gas recovery factor and gas cumulative production if the relationship between annual and total gas production has the form $\frac{Q_{річн}}{Q_{зап}} = 2{,}35 - 0{,}01\frac{Q_{сум}}{Q_{зап}}$, % Initial gas reserves equal $30 \cdot 10^6$ m^3.

2. Specify initial gas reserves that developed in gas drive if: reservoir temperature - 67°C, gas gravity – 0.6.

P_{init} MPa	30.6	29.7	28.5	26	25.2	24.3	23	22	21.1	20.4
Q(t) 10^6 m^3	1.1	2.5	4.2	6	7.7	8.5	9.5	10.7	11.6	12.4

8

1. Determine current gas recovery factor of gas deposit on gas drive for the data: gas productive area – $6.2 \cdot 10^8$ m^2, efficient gas-saturated reservoir thickness - 15 m, initial gas saturation - 0.76, open porosity coefficient - 0.18, initial reservoir pressure - 40 MPa, reservoir temperature - 81 ° C, gas gravity - 0.6, gas cumulative production from the field - $65 \cdot 10^9$ m^3.

2. Determine current gas recovery factor and final gas recovery factor deposit on gas drive the method of average production for the data:

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
$Q(t) \cdot 10^6 m^3$	1	2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3
$Q_{prod}(t)$ $10^6 m^3$	1	3	6	10	15	21	28	36	45	55	64	72	79	85	90	94	97

Initial gas reserves in gas field - $145 \cdot 10^6 m^3$.

9

1. Determine current gas recovery factor for the gas field, which is developing in the gas drive for the following data: initial reservoir pressure is 39 MPa, the current reservoir pressure - 18MPa, reservoir temperature - 82°C, gas gravity - 0.54.

2. Determine current gas recovery factor and final gas recovery factor deposit on gas drive the method of straight line for the data:

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
$Q(t) \cdot 10^6 m^3$	1	2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3
$Q_{prod}(t)$ $10^6 m^3$	1	3	6	10	15	21	28	36	45	55	64	72	79	85	90	94	97

Initial gas reserves in gas field - $146 \cdot 10^6 m^3$.

10

1. Determine initial gas reserves in gas field with reservoir radius 970m, initial gas saturation 0.8, effective porosity - 0.16, reservoir thickness 30m, initial reservoir pressure 30MPa, reservoir temperature 68 ^{0}C, and gas gravity 0.6.

2. Determine current gas recovery factor and final gas recovery factor deposit on gas drive the method of average production for the data:

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
$Q(t)\cdot10^6m^3$	1	2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3
$Q_{prod}(t)$ 10^6m^3	1	3	6	10	15	21	28	36	45	55	64	72	79	85	90	94	97

Initial gas reserves in gas field - $152\cdot10^6m^3$.

11

1. Determine the initial gas reserves in the field according to the data of its development and current gas recovery factor, if cumulative gas production $60\cdot10^9$ m^3, and the dependence of the reduced reservoir pressure (y) on cumulative gas production (x) is described by the equation: $32-0{,}66\cdot Q_{cum}$; P, MPa; Q_{cum}, 10^9 m^3.

2. Determine current gas recovery factor and final gas recovery factor deposit on gas drive the method of of straight line for the data:

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
$Q(t)\cdot10^6m^3$	1	2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3
$Q_{prod}(t)$ 10^6m^3	1	3	6	10	15	21	28	36	45	55	64	72	79	85	90	94	97

Initial gas reserves in gas field - $151\cdot10^6m^3$.

12

1. Gas reservoir is developing in gas drive. The dependence of the average reduced reservoir pressure described by the equation $\frac{P}{z}=20\text{-}0{,}5\ Q_{cum}$; (P, MPa, Q_{cum} 10^9 m^3). Determine the initial gas reserves and the current gas recovery factor after reservoir pressure reduction by 50% from the initial pressure if the initial reservoir pressure 37 MPa, reservoir temperature 70°C, gas gravity - 0.6.

2. Specify initial gas reserves that developed in gas drive if: reservoir temperature - 70°C, gas gravity – 0.55.

P_{init} MPa	30.4	29.2	28.8	27	25.7	24	23.1	22	21.2	20.4
Q(t) 10^6 m^3	1.7	2.7	4.7	6.7	7.7	8.7	9.7	10.7	11.7	12.7

13

1. Determine final gas recovery factor and gas cumulative production if the relationship between annual and total gas production has the form $\frac{Q_{річн}}{Q_{зап}} = 3{,}24 - 0{,}01\frac{Q_{сум}}{Q_{зап}}$, % Initial gas reserves equal $60 \cdot 10^6$ m^3.

2. Specify initial gas reserves that developed in gas drive if: reservoir temperature - 60°C, gas gravity – 0.61.

P_{init} MPa	30.6	29.7	28.5	26	25.2	24.3	23	22	21.1	20.4
Q(t) 10^6 m^3	1.1	2.5	4.2	6	7.7	8.5	9.5	10.7	11.6	12.4

14

1. Determine current gas recovery factor of gas deposit on gas drive for the data: gas productive area - $7 \cdot 10^8$ m^2, efficient gas-saturated reservoir thickness - 15 m, initial gas saturation - 0.79, open porosity coefficient - 0.18, initial reservoir pressure - 40 MPa, reservoir temperature - 80 ° C, gas gravity - 0.6, gas cumulative production from the field - $66 \cdot 10^9$ m^3.

2. Determine current gas recovery factor and final gas recovery factor deposit on gas drive the method of average production for the data:

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
$Q(t) \cdot 10^6 m^3$	1	2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3
$Q_{prod}(t)$ $10^6 m^3$	1	3	6	10	15	21	28	36	45	55	64	72	79	85	90	94	97

Initial gas reserves in gas field - $154 \cdot 10^6 m^3$.

15

1. Determine current gas recovery factor for the gas field, which is developing in the gas drive for the following data: initial reservoir pressure is 32 MPa, the current reservoir pressure - 20MPa, reservoir temperature - 85°C, gas gravity - 0.57.

2. Determine current gas recovery factor and final gas recovery factor deposit on gas drive the method of straight line for the data:

Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
$Q(t) \cdot 10^6 m^3$	1	2	3	4	5	6	7	8	9	10	9	8	7	6	5	4	3
$Q_{prod}(t)$ $10^6 m^3$	1	3	6	10	15	21	28	36	45	55	64	72	79	85	90	94	97

Initial gas reserves in gas field - $136 \cdot 10^6 m^3$.