**Задание 1.** Выбрать номинальные размеры диаметров и длин валов по указанному ряду предпочтительности, если при расчете размеров деталей получены следующие значения: d1,d2, l1, l2, l3.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| № варианта | Ряд | Расчетные значения, мм | | | | |
| d1 | d2 | l1 | l2 | l3 |
| 1 | *Ra20* | 52,3 | 23 | 19 | 73,9 | 33,8 |
| 2 | *Ra5* | 37,6 | 12,8 | 39,7 | 54 | 172,6 |
| 3 | *Ra10* | 12,6 | 15.6 | 46 | 67 | 98 |
| 4 | *Ra20* | 14 | 37 | 54 | 70 | 116 |
| 5 | *Ra40* | 11 | 2.8 | 41 | 78,2 | 252 |
| 6 | *Ra5* | 221 | 19 | 33 | 85 | 106 |
| 7 | *Ra10* | 12 | 18 | 24 | 72 | 360 |
| 8 | *Ra20* | 35 | 47 | 78 | 87 | 109 |
| 9 | *Ra40* | 15,8 | 37 | 48 | 154 | 237 |
| 10 | *Ra5* | 12 ,5 | 17 | 21 | 307 | 98 |
| 11 | *Ra10* | 34 | 27 | 65 | 75 | 105 |
| 12 | *Ra20* | 75 | 35 | 43 | 87 | 98 |
| 13 | *Ra40* | 17 | 57 | 41 | 68 | 97 |
| 14 | *Ra5* | 23 | 115 | 75 | 33 | 62 |
| 15 | *Ra10* | 54 | 93.8 | 56,9 | 73 | 185 |
| 16 | *Ra20* | 82 | 197 | 37,8 | 45 | 63 |
| 17 | *Ra40* | 27 | 101,9 | 65 | 34 | 98 |
| 18 | *Ra5* | 53 | 123 | 78 | 87 | 49 |
| 19 | *Ra10* | 82 | 175 | 94 | 128 | 93 |
| 20 | *Ra20* | 78 | 9,6 | 64 | 75 | 61 |
| 21 | *Ra40* | 120 | 25 | 14,5 | 102 | 23 |
| 22 | *Ra5* | 12 | 35 | 154 | 6 | 84 |
| 23 | *Ra10* | 178 | 58 | 15 | 78 | 102 |
| 24 | *Ra20* | 78 | 114 | 50 | 210 | 36 |
| 25 | *Ra40* | 260 | 12,5 | 159 | 20 | 36,8 |
| 26 | *Ra5* | 100 | 11 | 74 | 187 | 98 |
| 27 | *Ra10* | 197 | 46 | 62 | 120 | 8 |
| 28 | *Ra20* | 14 | 33 | 4 | 42 | 82 |
| 29 | *Ra40* | 160 | 38 | 5 | 76 | 150 |
| 30 | *Ra5* | 11 | 26 | 98 | 16,8 | 54 |
| 31 | *Ra10* | 200 | 58 | 111 | 10 | 168 |

**Задание 2.** Определить годность валов по результатам их измерений, т.е. по действительному размеру.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **, мм** | **Обозначение на чертеже** | | | | | |
| **№ варианта** | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** |
|  |  |  | **50** |  |  |
| **50** |  |  |  |  |  |  |
| **50,01** |  |  |  |  |  |  |
| **50,2** |  |  |  |  |  |  |
| **49,05** |  |  |  |  |  |  |
| **49,3** |  |  |  |  |  |  |
| **49,07** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **, мм** | **№ варианта** | | | | | |
| 7 | **8** | **9** | **10** | **11** | **12** |
|  |  |  | **250,5** |  |  |
| **25,1** |  |  |  |  |  |  |
| **25,45** |  |  |  |  |  |  |
| **24,7** |  |  |  |  |  |  |
| **24,55** |  |  |  |  |  |  |
| **25,15** |  |  |  |  |  |  |
| **25,04** |  |  |  |  |  |  |
|  | **№ варианта** | | | | | |
| 13 | 14 | 15 | 16 | 17 | 18 |
|  |  | **120** |  |  |  |
| **120,04** |  |  |  |  |  |  |
| **120,06** |  |  |  |  |  |  |
| **119,01** |  |  |  |  |  |  |
| **119,01** |  |  |  |  |  |  |
| **120,07** |  |  |  |  |  |  |
| **119** |  |  |  |  |  |  |

**Задание 3.** Выбрать правильное обозначение отклонений на чертежах деталей из следующих вариантов:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Варианты обозначений предельных отклонений** | | | | |
| **1** | **2** | **3** | **4** | **5** |
| *Вариант 1* | |  |  | | --- | --- | | 40 | +0,400 | | -0,02 | | |  |  | | --- | --- | | 40 | -0,45 | | -0,20 | | |  |  | | --- | --- | | 40 | +0,25 | | 0 | | |  | | --- | | 40±0,85 | | | |  |  | | --- | --- | | 40 | +0,65 | | +0,20 | |
| *Вариант 2* | |  |  | | --- | --- | | 25 | \_0,15 | |  | | |  |  | | --- | --- | | 25 | +0,45 | | -0,60 | | |  |  | | --- | --- | | 25 |  | | \_0,4 | | |  |  | | --- | --- | | 25 | +0,8 | | +0,65 | | |  | | --- | | 25±3 | |
| *Вариант 3* | |  |  | | --- | --- | | 75 | +0,45 | | +0,75 | | |  |  | | --- | --- | | 75 |  | | -0,45 | | |  | | --- | | 75±4 | | |  |  | | --- | --- | | 75 | \_0,2 | | -0,60 | | |  |  | | --- | --- | | 75 | -0,15 | | -0,33 | |
| *Вариант 4* | |  |  | | --- | --- | | 110 |  | | +2 | | |  |  | | --- | --- | | 110 | +3 | | -2 | | |  |  | | --- | --- | | 110 | -4 | |  | | |  |  | | --- | --- | | 110 | ±5 | |  | | |  |  | | --- | --- | | 110 | +10 | |  | |
| *Вариант 5* | |  |  | | --- | --- | | 350 | -15 | |  | | |  |  | | --- | --- | | 350 |  | | -25 | | |  |  | | --- | --- | | 350 | +40 | | +20 | | |  |  | | --- | --- | | 350 | 45 | |  | | |  | | --- | | 350±15 | | |
| *Вариант 6* | |  |  | | --- | --- | | 75 | -0,60 | | -0,250 | | |  |  | | --- | --- | | 75 | +10 | |  | | |  | | --- | | 75±5 | | | |  |  | | --- | --- | | 75 | -5 | | -30 | | |  |  | | --- | --- | | 75 | +9 | | +2 | |
| *Вариант 7* | |  |  | | --- | --- | | 130 | +15 | | +5 | | |  |  | | --- | --- | | 130 | -10 | | -20 | | |  | | --- | | 130±10 | | | |  |  | | --- | --- | | 130 | +25 | |  | | |  |  | | --- | --- | | 130 |  | | +8 | |
| *Вариант 8* | |  |  | | --- | --- | | 65 | \_25 | |  | | |  | | --- | | 65±7 | | | |  |  | | --- | --- | | 65 | +4 | | -9 | | |  |  | | --- | --- | | 65 |  | | -35 | | |  |  | | --- | --- | | 65 | -10 | | -25 | |
| *Вариант 9* | |  |  | | --- | --- | | 35 |  | | -9 | | |  |  | | --- | --- | | 35 | +5 | |  | | |  | | --- | | 35±0,8 | | | |  |  | | --- | --- | | 35 | +5 | | -9 | | |  |  | | --- | --- | | 35 | +15 | | +7 | |
| *Вариант 10* | |  | | --- | | 87±7 | | | |  |  | | --- | --- | | 87 | -2 | | -4 | | |  |  | | --- | --- | | 87 |  | | -15 | | |  |  | | --- | --- | | 87 | +4,5 | | +1,5 | | |  |  | | --- | --- | | 87 | -15 | |  | |
| *Вариант 11* | |  |  | | --- | --- | | 95 | -3 | | -7 | | |  |  | | --- | --- | | 95 |  | | +7 | | |  |  | | --- | --- | | 95 | -2 | |  | | |  |  | | --- | --- | | 95 | +10 | | -8 | | |  | | --- | | 95±5 | | |
| *Вариант 12* | |  |  | | --- | --- | | 44 | -15 | | +10 | | |  |  | | --- | --- | | 44 | +2 | | -6 | | |  | | --- | | 44±10 | | | |  |  | | --- | --- | | 44 | +5 | | -2 | | |  |  | | --- | --- | | 44 |  | | +5 | |
| *Вариант 13* | |  |  | | --- | --- | | 38 | -5 | |  | | |  |  | | --- | --- | | 38 | +10 | | -6 | | |  |  | | --- | --- | | 38 |  | | -4 | | |  |  | | --- | --- | | 38 | -4 | | -9 | | |  | | --- | | 38±2 | | |
| *Вариант 14* | |  |  | | --- | --- | | 148 | +15 | | +5 | | |  |  | | --- | --- | | 148 |  | | +15 | | |  |  | | --- | --- | | 148 | +10 | | -20 | | |  |  | | --- | --- | | 148 | -5 | |  | | |  | | --- | | 148±12 | | |
| *Вариант 15* | |  |  | | --- | --- | | 85 |  | | -2 | | |  | | --- | | 85±7 | | | |  |  | | --- | --- | | 85 | +9 | | +5 | | |  |  | | --- | --- | | 85 | -7 | |  | | |  |  | | --- | --- | | 85 | +10 | | +9 | |
| *Вариант 16* | |  |  | | --- | --- | | 55 | +0,3 | | -3 | | |  |  | | --- | --- | | 55 | +9 | |  | | |  |  | | --- | --- | | 55 | +6 | | -4 | | |  |  | | --- | --- | | 55 | +8 | | -15 | | |  | | --- | | 55±10 | | |
| *Вариант 17* | |  |  | | --- | --- | | 33 |  | | -9 | | |  |  | | --- | --- | | 33 | -2 | | -9 | | |  |  | | --- | --- | | 33 | +5 | | 01 | | |  | | --- | | 33±1,5 | | | |  |  | | --- | --- | | 33 | +2 | | -4 | |
| *Вариант 18* | |  |  | | --- | --- | | 65 | -6 | |  | | |  | | --- | | 65±4 | | | |  |  | | --- | --- | | 65 | +10 | | -5 | | |  |  | | --- | --- | | 65 | +9 | | +4 | | |  |  | | --- | --- | | 65 |  | | -6 | |

**Задание №3**

Даны посадки **с зазором, натягом и переходная**. Определить предельные отклонения, размеры, зазоры, натяги и допуски отверстия и вала, начертить схему интервалов допусков.

|  |  |  |  |
| --- | --- | --- | --- |
| Вариант | Посадка | | |
| 1 | 2 | 3 |
| ***1*** |  |  |  |
| ***2*** |  |  |  |
| ***3*** |  |  |  |
| ***4*** |  |  |  |
| ***5*** |  |  |  |
| ***6*** |  |  |  |
| ***7*** |  |  |  |
| ***8*** |  |  |  |
| ***9*** |  |  |  |
| ***10*** |  |  |  |
| ***11*** |  |  |  |
| ***12*** |  |  |  |
| ***13*** |  |  |  |
| ***14*** |  |  |  |
| ***15*** |  |  |  |
| ***16*** |  |  |  |
| ***17*** |  |  |  |
| ***18*** |  |  |  |

**Задание №4**

Для посадки в системе вала известны D, Smax, Smin, TD = Td. Определить предельные размеры и отклонения, TD, записать обозначение посадки с предельными отклонениями и начертить схему интервалов допусков.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **№ Вар** | **D, мм** | **Smax, мкм** | **Smin, мкм** | **№ Вар** | **D, мм** | **Smax, мкм** | **Smin, мкм** |
| ***1*** | 19 | 42 | 18 | ***16*** | 37 | 78 | 22 |
| ***2*** | 64 | 112 | 36 | ***17*** | 18 | 108 | 32 |
| ***3*** | 25 | 74 | 36 | ***18*** | 92 | 96 | 20 |

**Задача № 5.**

Для посадки в системе отверстия известны D. TD ,Td, Nmin. Определить предельные отклонения и размеры. Nmax; начертить схему полей допусков.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **№**  **Варианта** | **D, мм** | **TD, мкм** | **Td, мкм** | **Nmin, мкм** | **№**  **варианта** | **D, мм** | **TD, мкм** | **Td, мкм** | **N min,мкм** |
| ***1*** | 80 | 38 | 12 | 4 | ***14*** | 64 | 40 | 30 | 6 |
| ***2*** | 60 | 30 | 18 | 12 | ***15*** | 70 | 30 | 19 | 5 |
| ***3*** | 54 | 28 | 18 | 6 | ***16*** | 96 | 28 | 26 | 4 |
| ***4*** | 72 | 46 | 24 | 8 | ***17*** | 60 | 24 | 9 | 3 |
| ***5*** | 42 | 54 | 36 | 12 | ***18*** | 72 | 54 | 18 | 12 |

**Задача 2.1.** Для заданной посадки 1 определить предельные размеры отверстия и вала; зазоры и натяги, дать графическое изображение посадки.

Для заданной посадки 2 определить допуски отверстия и вала; рассчитать зазоры, натяги, построить схему интервалов допусков; дать условное обозначение посадки; установить систему, группу и вид посадки.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Вариант** | **Посадка 1** | **Посадка 2** | **Вариант** | **Посадка 1** | **Посадка 2** |
| ***1*** | 19Н7/е8 |  | ***14*** | 53H7/h6 |  |
| ***2*** | 40H7/js6 |  | ***15*** | 20H7/n6 |  |
| ***3*** | 45H7/k6 |  | ***16*** | 22H7/h6 |  |
| ***4*** | 19H7/s6 |  | ***17*** | 42H7/r6 |  |
| ***5*** | 24H9/d8 |  | ***18*** | 53N7/h6 |  |

**Задача 2.2.** а) Для сопрягаемых деталей с номинальным размером *D1* (табл. 2.8) выбрать посадку в системе отверстия, с гарантированным зазором . Отверстие выполнено по *n1* квалитету. Начертить схему интервалов допусков, определить предельные размеры деталей, наибольший зазор.

б) Для сопрягаемых деталей с номинальным размером *D2* выбрать посадку в системе вала, с гарантированным натягом . Вал выполнен по *n2*квалитету. Начертить схему интервалов допусков, определить предельные размеры деталей, наибольший натяг.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| № вари-анта | D1, мм | ,мкм |  | D2, мм | ,мкм |  | № вари-анта | D1, мм | ,мкм |  | D2, мм | ,мкм |  |
| ***1*** | 14 | 6 | 6 | 30 | 31 | 8 | ***14*** | 19 | 160 | 6 | 80 | 2 | 7 |
| ***2*** | 17 | 6 | 7 | 65 | 0 | 7 | ***15*** | 24 | 7 | 6 | 120 | 6 | 7 |
| ***3*** | 20 | 300 | 7 | 80 | 13 | 8 | ***16*** | 27 | 20 | 7 | 160 | 10 | 7 |
| ***4*** | 21 | 65 | 7 | 100 | 23 | 7 | ***17*** | 30 | 110 | 8 | 145 | 45 | 7 |
| ***5*** | 22 | 40 | 8 | 100 | 17 | 8 | ***18*** | 31 | 170 | 7 | 160 | 71 | 8 |