ASME Y14.5-2009 GDTP PRACTICE EXAM

1) Theoretically exact location of a feature established by basic dimensions is called the

a) Virtual condition

b) Datum simulator

c) True position

d) Datum feature

2) One cylindrical or spherical surface, or set of two opposed elements or opposed surfaces, associated with a size dimension defines a

a) Limit of size

b) Feature of size

c) Tolerance zone

d) Profile tolerance

3) A tolerance in which variation is permitted in both directions from the specified dimension is defined as

a) Unilateral

b) Bilateral

c) Inner boundary

d) Outer boundary

4) The space between the first dimension line and the part outline should not be less than

a) 6mm

b) 8mm

c) 10mm

d) 12mm

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5) The space between succeeding parallel dimension lines should not be less than

a) 6mm

b) 8mm

c) 10mm

d) 12mm

6) Leaders normally terminate with a(n)

a) tilde

b) note

c) symbol

d) arrowhead

7) Notes should be placed to read from the _____ on the drawing with regard to the orientation of the drawing format.

a) bottom

b) top

c) upper left

d) upper right

8) The proper method for identifying a reference dimension on a drawing is to

a) enclose the dimensions in brackets [ ]

b) place the word "REF" after the dimension

c) enclose the dimensions in parenthesis ( )

d) place a line beneath the value

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9) Rectangular or polar coordinate dimensions locate features with respect to

a) one another as a pattern

b) a group

c) Individually dimensioned features

d) one another, and as a group or individually, from a datum or an origin.

10) The single worst-case boundary generated by the collective effects of a feature of the size's specified MMC or LMC, the geometric tolerance for that material condition, the size tolerance, and the additional geometric tolerance derived from the feature's departure from its specified material condition defines the

a) resultant condition

b) inner boundary

c) outer boundary

d) resultant condition size

11) The total amount a specific dimension is permitted to vary is defined as the

a) limits of size

b) virtual condition

c) tolerance

d) geometric tolerance

12) The actual feature of a part that is used to establish a datum is defined as the

a) datum

b) datum simulator

c) feature

d) datum feature

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13) The value of any individual distance at any cross section of a feature is defined as the

a) nominal size

b) dimension

c) actual size

d) actual local size

14) A constant boundary generated by the collective effects of a size feature's specified MMC or LMC material condition and the geometric tolerance for that material condition is defined as

a) virtual condition

b) resultant condition

c) nominal size

d) actual mating envelope

15) _____ dimensioning shall be used on drawings except where certain commercial commodities are identified by standardized nominal designations, such as pipe and lumber sizes.

a) decimal

b) decimal inch

c) millimeter

d) conversion and rounding of linear units

16) The condition in which a feature of size contains the maximum amount of material within the stated limits of size is definition for

a) least material condition

b) virtual condition

c) maximum material condition

d) regardless of feature size

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17) A theoretically exact plane derived from the datum simulator of the specificities feature surface is the definition for

a) center plane of the feature

b) datum plane

c) tangent plane

d) datum target

18) _____ are dimensioned by a linear dimension and an angle or by two linear dimensions.

a) countersinks

b) chamfers

c) arcs

d) knurled surfaces

19) The worst case inner boundary is the _____, minus the stated and any additional geometric tolerance.

a) smallest feature

b) largest feature

c) MMC for an external feature

d) LMC for an internal feature

20) Key seats are dimensioned by width, depth, location, and if required, length. The depth is _____

a) dimensioned with no restrictions

b) dimensioned from the axis side of the shaft or hole

c) dimensioned from the opposite side of the shaft or hole

d) not critical to most of the designs requirements

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21) The end radii of slotted holes _____

a) have to be dimensioned

b) are indicated but not dimensioned

c) are dimensioned and indicated as well

d) should neither be indicated nor dimensioned

22) Unless otherwise specified, all dimensions are applicable at

a) 23 C or 70 F

b) 21 C or 68 F

c) 72 F or 20 C

d) 20 C or 68 F

23) Tolerances _____

   a) may be applied directly to the dimensions
   b) can be indicated by a general note
   c) located in a supplementary block of the drawing format
   d) all of the above

24) Chamfers may:

a) be used to specify any degrees in a general note

b) not be used in a note

c) can be used in a note to specify 45 degree chamfers.

d) can be used in a note to specify 45 and 90 degree chamfers.

25) Patterns such as holes and slots may be specified by

a) using the abbreviation "PLCS"

b) using "X"

c) using the abbreviation "PLC"

d) using the abbreviation "PL"

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26) Flatness may be applied on unit basis

a) to prevent abrupt surface variation within a relatively small area of the feature.

b) to measure localized areas.

c) to use as a means of quantifying form measurements.

d) to use as a means of qualifying form tolerances one section at a time.

27) Flatness tolerances specifies a

a) tolerance zone between two parallel planes which is related to datums

b) a tolerance zone between two parallel planes with some of the surface elements must lie.

c) a tolerance zone between two parallel planes where all the surface elements must lie and be oriented to a datum.

d) a tolerance zone between two parallel planes where all the surface elements must lie.

28) Datum shift or datum displacement only occurs with when the work piece have datums that are_____

a) features without size

b) features of size

c) in a condition where it is restrained causing the work piece to be displaced.

d) a condition that is only reserved for work pieces that are deemed unique.

29) The title of section 6 is:

a) Tolerances of Location

b) Tolerances of Profile

c) Tolerances of Orientation

d) Tolerances of Form

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30) The drawing should define the part

a) and always specify the inspection method

b) and define the temperature to be inspected

c) and should be regarded as a legal document

d) without specifying manufacturing methods.

31) Where it is desired to indicate that a limited length or area of a surface is to receive special treatment within the drawing, the extent of these limits may be indicated by the use of a

a) phantom line

b) centerline

c) dash line

d) chain line

32) The purpose of the appendix in the ASME Y14.5-2009 is to identify and illustrate former symbols, terms and methods of dimensioning features in

a) ANSI Y14.5M-1982

b) ASME Y14.5M-1994

c) ASME Y14.5-1994

d) MIL-STD-8

33) A datum feature simulator can be a

a) surface plate

b) gage surface

c) mandrel

d) all of the above

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34) The actual local size of an individual feature

a) shall be within the envelope tolerance of the unrelated actual mating envelope

b) must be within the limits of size

c) can sometimes vary outside the limits of size

d) at each cross section shall be within the specified tolerance of size.

35) The single worst-case boundary generated by the collective effects of a feature of size's specified a MMC or LMC, the geometric tolerance for that material condition, the size tolerance, and the additional geometric tolerance derived from the feature's departure from its specified material condition is:

   a) resultant condition
   b) virtual condition
   c) a means of calculating the MMC and LMC condition of a feature of size.
   d) Worst case boundary that affects the positional tolerance of a feature of size.

36) When the projected tolerance symbol is used in conjunction with a positional or orientation tolerance, the projected tolerance zone symbol placed in the feature control frame indicates the:

a) minimum height of the tolerance zone

b) maximum height of the tolerance zone

c) the average height of the tolerance zone

d) the nominal height of the tolerance zone

37) The standard used for gaging is:

a) ASME Y14.41

b) ASME Y14.8

c) ASME Y14.5.1

d) ASME Y14.43

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38) Datum feature symbols except the letters _____ can be used.

a) I, X, Z

b) DD, FF, WW

c) XX, YY, ZZ

d) I, O, Q

39) Circularity is a tolerance of

a) orientation

b) cylindricity

c) form

d) runout

40) Datum Target Points end with a leader line on the surface of a part

a) without an "X"

b) with a dot

c) with an "X"

d) without a dot nor an "X"

41) When using Total Runout, the feature being inspected must be

a) either parallel or perpendicular, but must be related to a datum

b) perpendicular to a datum

c) parallel to a datum

d) parallel and perpendicular to a datum

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42) When using non-uniform profile, which of the following is not true

a) the zone are defined on a 2D drawing using toleranced dimensions

b) can be defined in a CAD file

c) should be in a drawing using phantom lines to indicate the zone

d) the nomenclature in the feature control frame "NON-UNIFORM"

43) When using profile tolerancing, a sharp corner which is desired to be controlled tighter within the zone

a) can be indicated using a note

b) can be indicated by specifying a unique profile tolerance within the zone using PLTZF and FRTZF feature control frames.

c) by specifying the maximum radius

d) controlled using a basic dimension with a toleranced dimension simultaneously.

44) The symbols for maximum material condition and projected tolerance zone may

a) be used in a general note

b) not be used in a general note

c) not be used in a feature control frame

d) be used when dealing with a surface control.

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45) What is the concept for the datum in this example called?
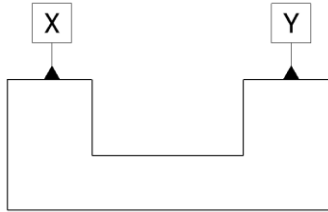
    a)   two datum features, single datum axis
    b)   single datum plane simulated
    c)   multiple datum plane simulated
    d)   complex datum features

46. Where the tolerance in a feature control frame is tabulated, _____ is the correct abbreviation to be used in the feature control frame.

a) TOL

b) TAB

c) TB

d) SEE TAB

47. The diameter and radius symbols which precede their respective values should

a) be separated by a space

b) not be separated by a space

c) only be separated if dealing with size tolerances

d) only be separated in the feature control frames

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48. The datum order of precedence that is specified in a feature control frame should be based on the

a) alphabetic sequence of the datum letters

b) size and datum features

c) design requirements

d) proper inspection equipment

49. the parallelism control in this application
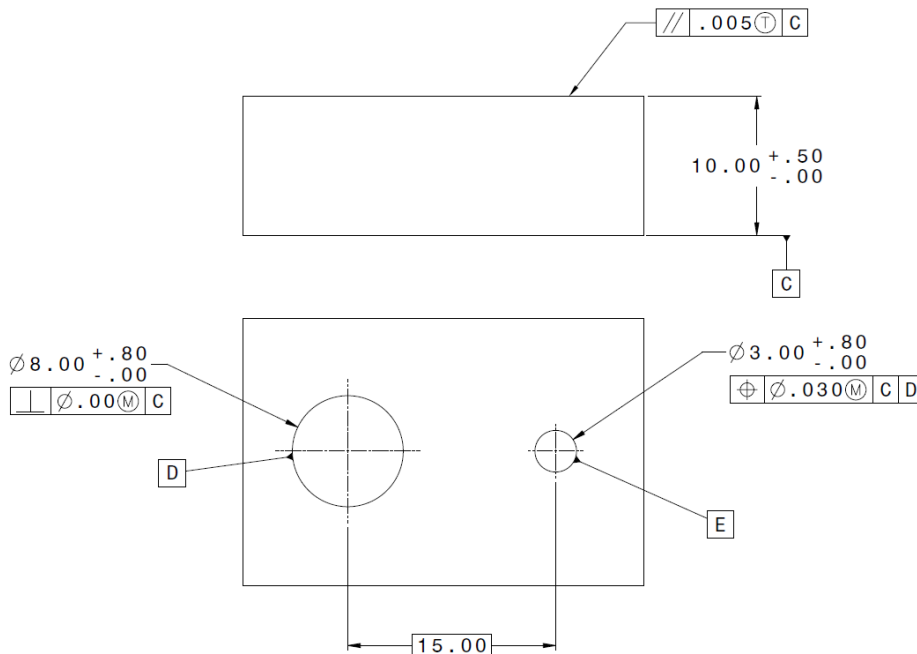
a)   Limits the flatness of the surface to 0.1
b)   Overrides rule #1
c)   Does not control the flatness of the surface
d)   Is illegal

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50. _____ is an exception to Rule #1

a) stock, such as bars, sheets, tubing, structural shapes

b) all dimensions that have overriding geometric tolerances

c) specially designed shapes

d) custom dimensions

51. Where bilateral tolerancing is used, both the plus and minus values and the dimension have

a) the same number of decimal places

b) a ± designation

c) a bilateral symbol

d) a space after the decimal

52. what is the virtual condition (outer boundary) of the hole?
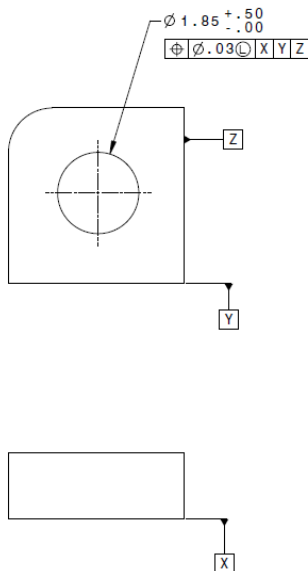
a) 1.82
b) 1.85
c) 2.38
d) 1.82

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53. For inch tolerances, when basic dimensions are used in association with geometric tolerances both

a) shall be followed by a zero

b) may or may not have the same number of places after the decimal point

c) shall not be followed by a zero

d) shall have the same number of places after the decimal point.

54. All limits are _____

a) followed by a zero

b) absolute

c) not followed by a zero

d) characterized by decimal places

55. MIN or MAX is placed after a dimension where _____.

a) other elements of the design determine the other unspecified limit

b) the dimension is absolute

c) the dimension is not absolute

d) the dimension is a diameter

56. Where a part is to be plated or coated, the _____.

a) drawing shall specify the requirement

b) implied dimension limits apply before plating

c) implied dimension limits apply after plating

d) implied dimensions apply before and after plating

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57. When a virtual condition equal to the MMC or the LMC is the design requirement, a _____ tolerance should be specified at MMC or LMC.

a) bilateral

b) zero

c) geometric

d) unilateral

58. Where only a tolerance of _____ is specified, the limits of size of an individual feature prescribe the extent to which variations in its geometric form, as well as size, are allowed.

a) form

b) orientation

c) size

d) location

59. Where no material modifying symbol is specified, _____ is the implied condition.

a) maximum material condition

b) least material condition

c) projected tolerance zone

d) regardless of feature size

60. When the part contour within the crescent-shaped tolerance zone is a fair curve without reversal, it is known as a

a) spherical radius

b) chamfer

c) controlled radius

d) radius

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61. Which dimension and its tolerance is expressed correctly?

a) 45.0° ± .3°

b) 45° ± .3°

c) 45.0° ± .35°

d) 45° ± .35°

62. for feature control frames with the MMC modifier specified after the tolerance, the virtual condition of an internal feature is a constant value equal to its maximum material condition size _____ its applicable tolerance.
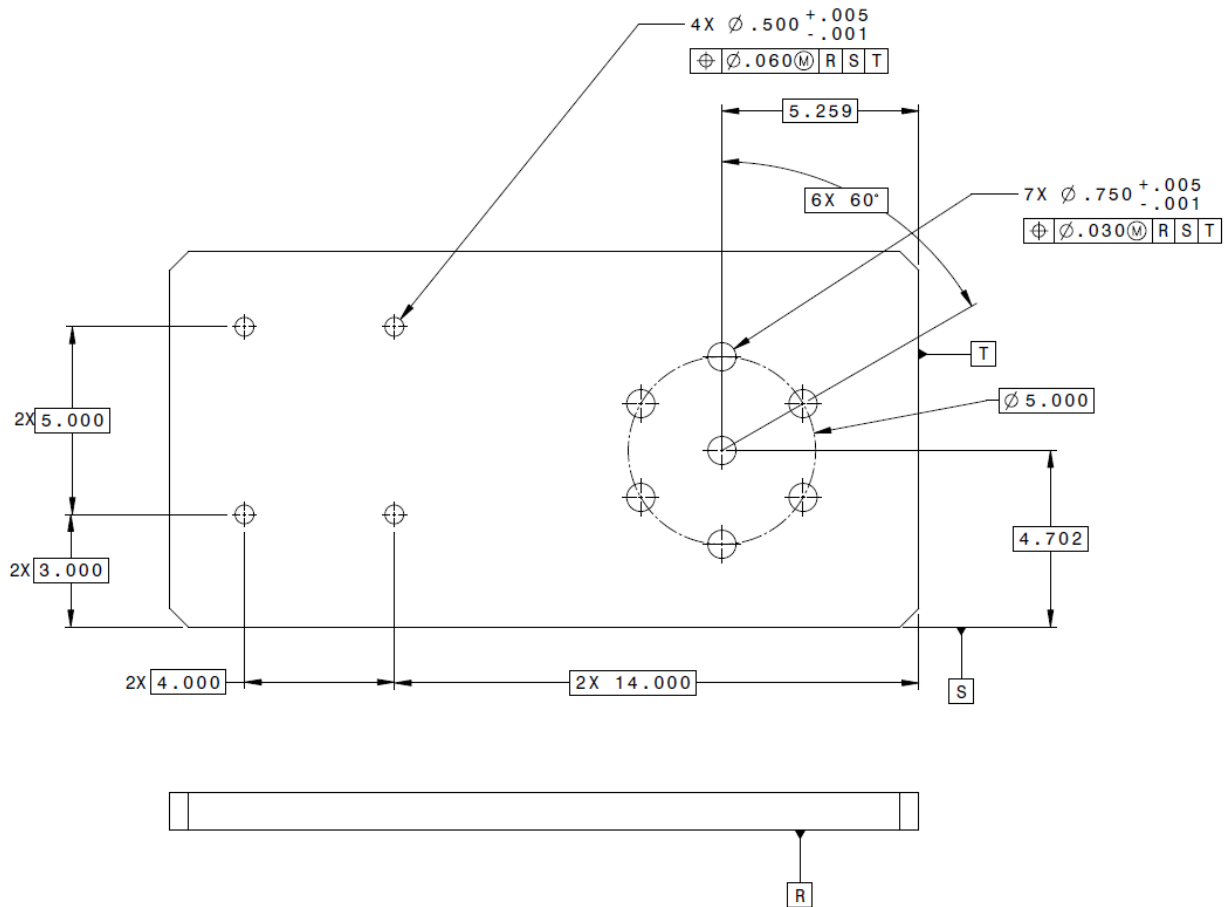
a) minus

b) plus

c) regardless of

d) including

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63. In the figure shown, when multiple patterns of features are located relative to common datum features, with the same order for the datums and the same modifiers they are considered to be _____.

a) Not valid in the standard
b) A composite positional tolerance frame
c) Independent patterns
d) A single pattern

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64. What would be the total positional tolerance allowed if the part was produced at the least material condition?
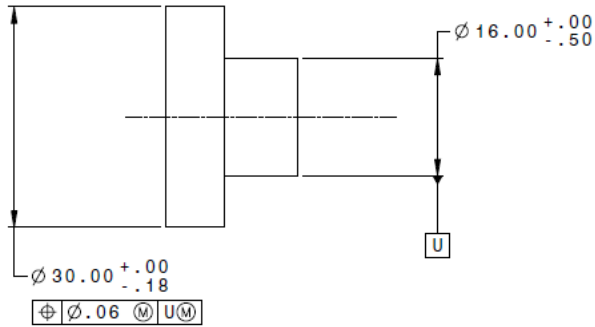
a) .50
b) .24
c) .06
d) .74

65. A projected tolerance zone affects the feature's _____.

a) mating size

b) perpendicularity

c) virtual condition

d) straightness

66. _____ of the design should be the basis for selecting datum features.

a) functional requirements

b) size

c) complexity

d) analysis

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67. Datum targets designate specific _____ on a part that are used in establishing a datum reference frame

a) points, lines, or areas of contact

b) points and lines

c) area of contact

d) profile boundaries

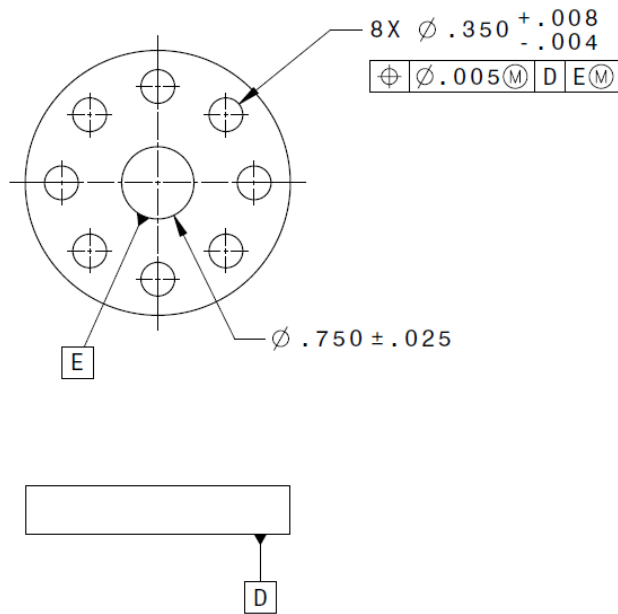68. Datum targets and datum features may be combined to establish a _____

a) boundary

b) limit of size

c) datum reference frame

d) location

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8X ∅ .350 +.008 -.004

⊕ | ∅.005Ⓜ | D | EⓂ

∅ .750±.025

E

D

USE DIAGRAM TO SOLVE QUESTIONS 69-71

69. If the part was produced and inspected and one of the small holes measured a diameter of .357, what would be the additional tolerance allowed for that hole?

a) .003

b) .006

c) .007

d) .011

70. What would be the diameter of the gage pin to verify the position of the hole pattern?

a) .725

b) .775

c) .341

d) .346

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71. What is the maximum material condition of the datum feature?

a) .775

b) .725

c) .750

d) .346

72. A primary datum feature related the part to the datum reference frame by bringing a minimum of _____ point(s) on the feature into contact with the first.

a) one

b) two

c) three

d) four

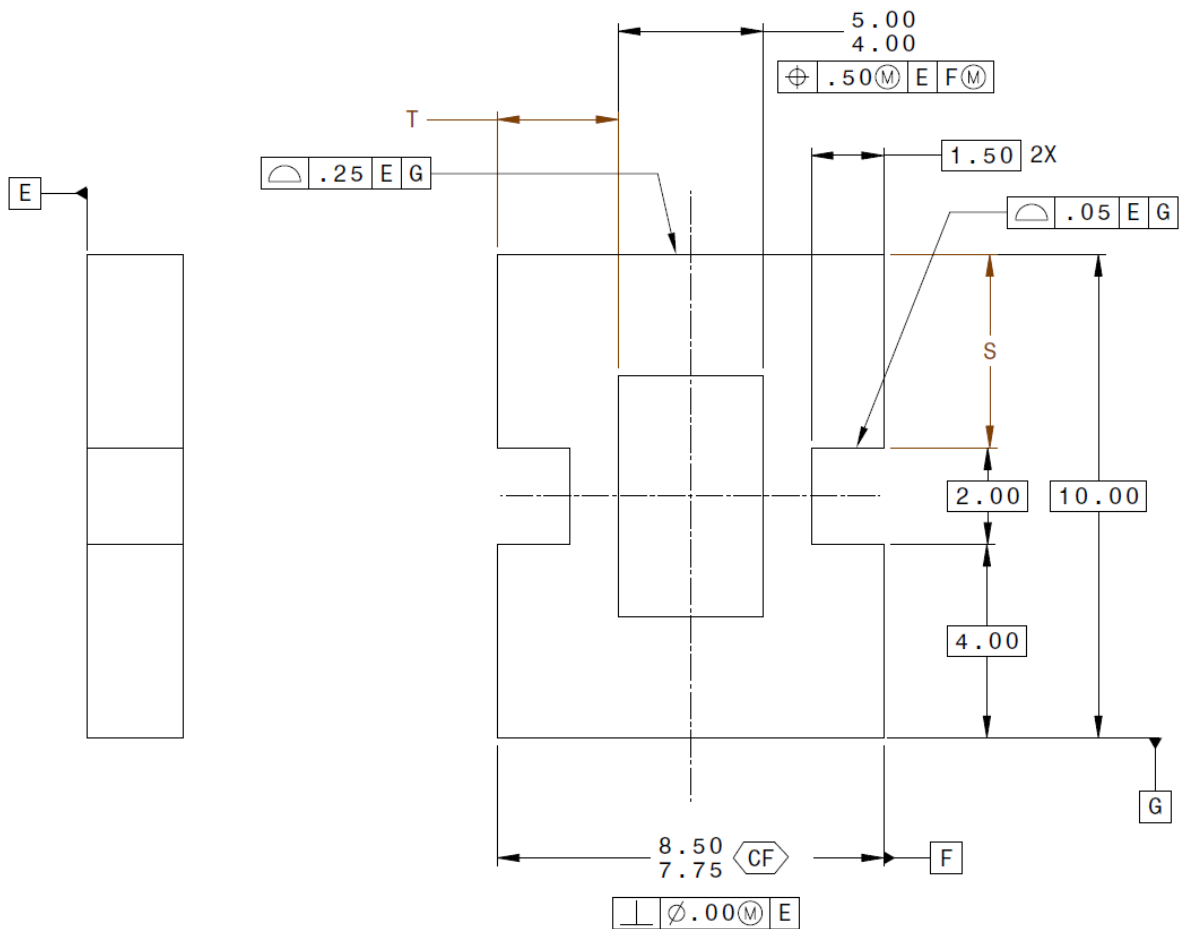73. When using an inclined datum feature, a true contacting plane is oriented at the _____ angle of the feature.

a) basic or toleranced

b) an intersection of two planes

c) toleranced

d) basic

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74. Calculate the maximum distance for S.

a) 3.92
b) 3.70
c) 4.30
d) 4.15

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75. Use the _____ to establish rotational orientation of two planes about a datum axis.

a) primary datum

b) secondary datum

c) primary and secondary datums

d) tertiary datum

76. Three mutually perpendicular intersecting planes are known as the datum _____.

a) surface

b) reference frame

c) plane

d) axes

77. A _____ is not a datum feature simulator of a feature used to establish a datum?

a) a tangent plane

b) MMB boundary

c) LMB boundary

d) resultant boundary

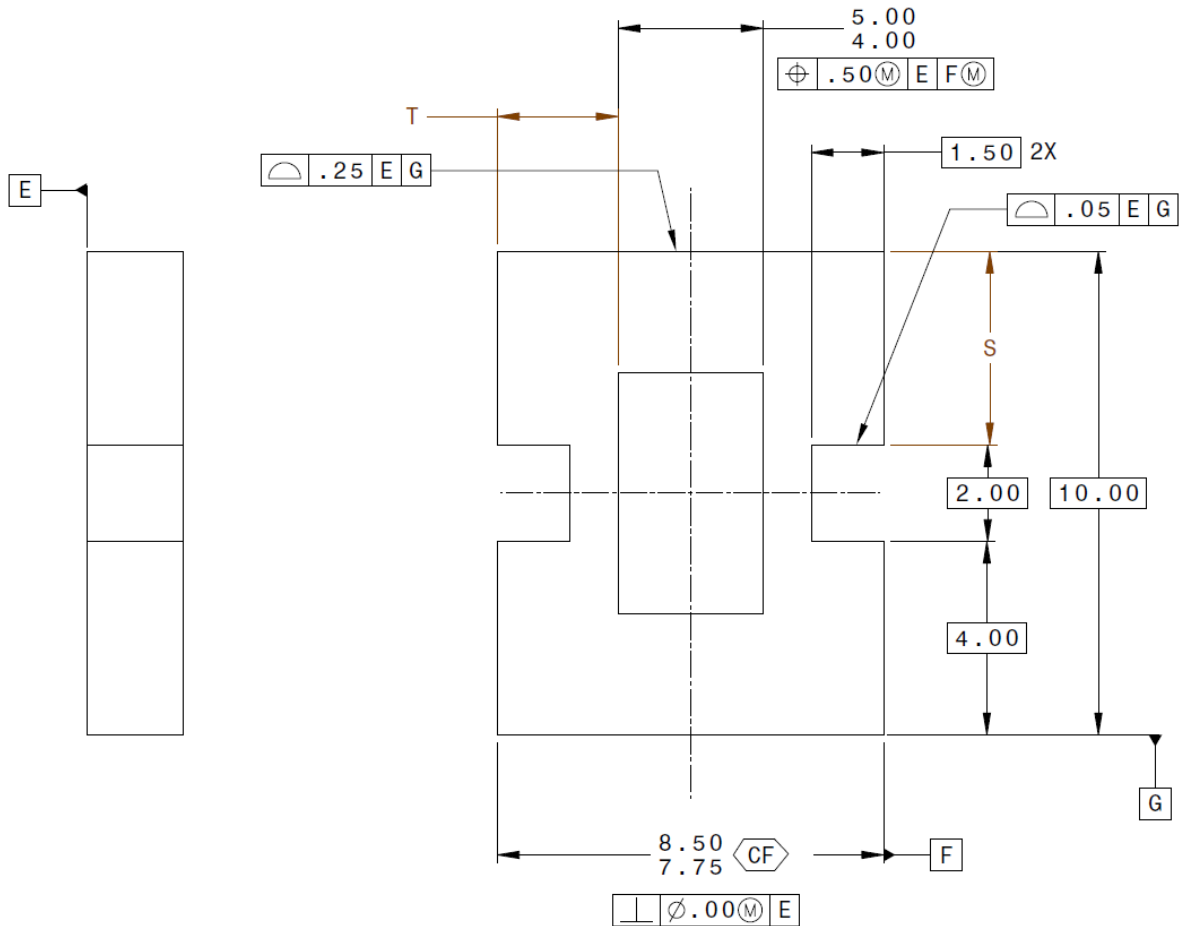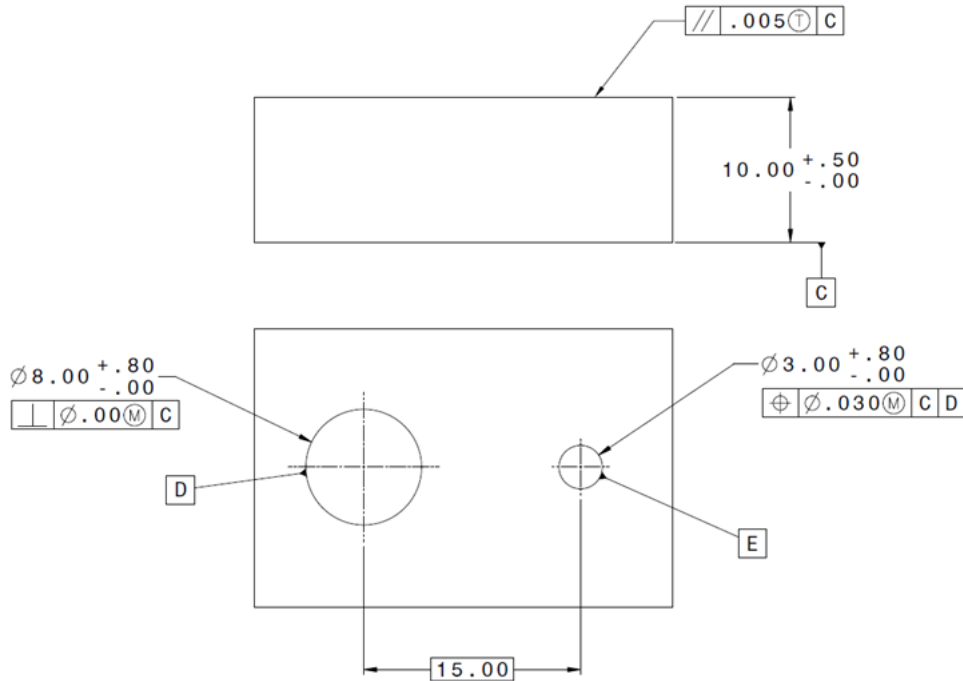## ASME Y14.5-2009 GDTP PRACTICE EXAM

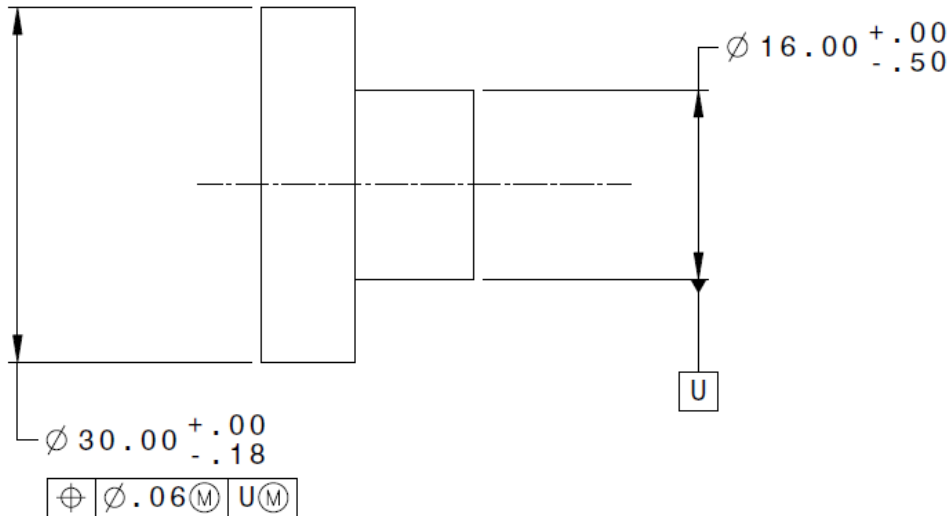78. Calculate a minimum distance for T.

a) .55
b) .45
c) .35
d) .25

79. Calculate the minimum distance allowed between the edge of the holes.

ASME Y14.5-2009 GDTP PRACTICE EXAM

a) 9.515
b) 8.285
c) 7.885
d) 8.510

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$\emptyset\ 16.00\ ^{+.00}_{-.50}$

$\emptyset\ 30.00\ ^{+.00}_{-.18}$

$\oplus\ |\ \emptyset.06 Ⓜ\ |\ UⓂ\ |$

U

USE THIS FIGURE TO ANSWER QUESTIONS 80 and 83.

80. How much displacement tolerance is possible from the datum feature?

a) .25

b) .00

c) .50

d) .06

81. An analysis of tolerance controls applied to a datum feature is necessary in determining the _____ of its datum feature simulator.

a) location

b) position

c) boundary size

d) shape

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82. Where a screw thread is specified as a datum reference, the datum axis is derived from the _____ unless otherwise specified.

a) thread flank angle

b) minor diameter

c) major diameter

d) pitch cylinder

83. Where necessary and when not used in conjunction with an orientation or position tolerance, the straightness tolerance may be _____ than the size tolerance.

   a) less
   b) equal
   c) greater
   d) independent

84. Where datums are specified in an order of precedence, the effect of its material boundary condition and order of precedence should be considered relative to

a) manufacturing requirements

b) cost

c functional requirements

d) the mating part

85. Where more than one datum feature is used to establish a datum feature simulator for a single datum, the appropriate datum feature reference letters and associated modifiers are

a) in separate compartments

b) must be specified using separate feature control frames

c) are separated by a dash and entered in the FRTZF compartment of the feature control frame.

d) are separated by a dash and entered in a single compartment of the feature control frame.

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86. PLTZF is an abbreviation for

a) Pattern Locating Tolerance Framework

b) Pattern Locating Tolerancing Framework

c) Pattern Locating Tolerance Zone Framework

d) Pattern Locating Tolerance Zone Frame

87. FRTZF is an abbreviation for

a) Feature Locating Tolerance Framework

b) Feature Locating Tolerancing Framework

c) Feature Locating Tolerance Zone Framework

d) Feature Locating Tolerance Zone Frame

88. Simultaneous Requirement is abbreviated as

a) SIMULTANEOUS REQT

b) SIM REQT

c) SIMUL REQT

d) SIMULTANEOUS REQUIREMENT

89. Separate requirement is abbreviated as

a) SEP REQT

b) SEPT REQT

c) SEPARATE REQT

d) SEPT REQUIREMENT

ASME Y14.5-2009 GDTP PRACTICE EXAM

90. With customizable datum reference frames, the letters used to define rotational constraints are

a) i, j, k

b) x, y, z

c) U, V, W

d) u, v, w

91) Where positional tolerances are used in locating holes of different specified sizes and the same requirements to all holes, a single feature control frame is supplemented by a notation such as

a) TWO HOLES COAXIAL

b) COAXIAL HOLES 2X

c) 2 COAXIAL HOLES

d) TWO COAXIAL HOLES

92) When invoking Separate Requirement, this also applies to the lower segment of a composite feature control frame.

a) true

b) false

c) only when Separate Requirement is invoked in the upper feature control frame.

d) depends on the requirements.

93) When specifying positional tolerancing, basic dimensions establishes the _____ from specified datum features and between _____ features.

a) feature of size, related

b) non features of size, interrelated

c) true position, interrelated

d) true position, related

ASME Y14.5-2009 GDTP PRACTICE EXAM

94) Where design permits, different _____ tolerances may be specified for the extremities of long holes, which establishes a _____ rather than a cylindrical tolerance zone.

a) concentricity, concentric

b) symmetrical, symmetric

c) profile, bilateral

d) positional, conical

95) _____ is the condition where the median points of all diametrically opposed elements of a surface of revolution or the median points of correspondingly located elements of two or more radially disposed features are congruent with a datum axis or center point.

a) cylindricity

b) symmetry

c) coaxiality

d) concentricity

96) Using positional tolerance at MMC, in certain cases of extreme form deviation within limits of size, or orientation deviation of the hole, the tolerance in terms of the axis my not be exactly equivalent to tolerance in terms of the surface. In such cases

a) the axis of the unrelated actual mating envelope shall take precedence.

b) the surface interpretation shall take precedence.

c) the datum feature shall take precedence

d) the axis of the related actual mating envelope shall take precedence.

97) The formula T = H – F applies to

a) fixed fasteners

b) floating fasteners

c) limits and fits

d) part fitment

ASME Y14.5-2009 GDTP PRACTICE EXAM

98) Where it is desired to refine the orientation of the FRTZF cylinders as governed by the boundary established by the PLTZF cylinders the datum references specified in the upper segment of the frame are repeated, as applicable

a) and permissible in a different order of precedence, in the lower segment of the feature control frame.

b) and in a different order of precedence, in the lower segment of the feature control frame while specifying SEP REQT.

c) and in a different order of precedence, in the lower segment of the feature control frame.

d) and in the same order of precedence, in the lower segment of the feature control frame.

99) Where design considers require a closer control in the perpendicularity of a threaded hole than that allowed by the positional tolerance, a perpendicular tolerance applied as a _____ may be specified.

a) projected tolerance zone

b) refinement of the PLTZF

c) separate requirement

d) conical tolerance zone

100) _____ is normally a less complex requirement than _____.

a) circular runout, total runout

b) total runout, circular runout

c) profile tolerancing, runout tolerancing

d) none of the above

101) Runout tolerance may be applied to a datum feature(s) and related to the datum axis derived from that datum feature(s)

a) if design permits

b) True

c) False

d) none of the above

ASME Y14.5-2009 GDTP PRACTICE EXAM

102) the LIMITS and FITS standard is referred to as

a)ANSI B4.2

b) ANSI B89.3.1

c) ASME Y14.5.1M

d) ASME Y14.8

103) The datum translation modifier is shown as

a)

b)

c)

d)

104) The symbol is known as

a) interrelated

b) independency

c) infinite

d) intermediate

105) Where a hole is chamfered or countersunk on a curved surfaced, the diameter specified on the drawing applies at the _____ diameter of the chamfer or countersink.

a) major

b) minor

c) average

d) pitch

ASME Y14.5-2009 GDTP PRACTICE EXAM

106) If such interrelationship is not required, a notation such as SEP REQT is placed adjacent to each applicable feature control frame. This principle _____of composite feature control frames

a) applies to all to all segments

b) applies to the none of the segments

c) does not apply to the upper segment

d) does not apply to the lower segments

107) When knurling for press fit between parts, is specified by a note that includes the type of knurl required, its pitch, the toleranced diameter of the feature _____
knurling, and the _____ acceptable diameter after knurling.

a) after, maximum
b) after, minimum
c) before, maximum
d) before, minimum

108) Methods of specifying surface texture requirements are covered in

a) ASME B4.1
b) ANSI B92
c) ASME Y14.36M
d) ASME Y14.6

109) When referring to screw threads, the axis of the thread is derived from the

a) Major
b) Minor
c) Pitch
d) The MMC condition

110) For gears and splines, a notation such as MAJOR DIA, PITCH DIA or MINOR DIA must be specified and stated _____ the feature control frame or _____ the datum feature symbol.
a) above, adjacent
b) adjacent, adjacent
c) beneath, beneath
d) beneath, adjacent

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111) Implied 90° angle on a drawing _____.

a) has no tolerance

b) has the same tolerance as all other angular features on the drawing field governed by general angular tolerance notes or a general tolerance block

c) has a tolerance of plus or minus 1°

d) must have a geometric tolerance specified in the field of the drawing

112) What is the total position tolerance on the part if the slot was produced at 1.84 and datum feature X was produced at 3.81 in the figure below?
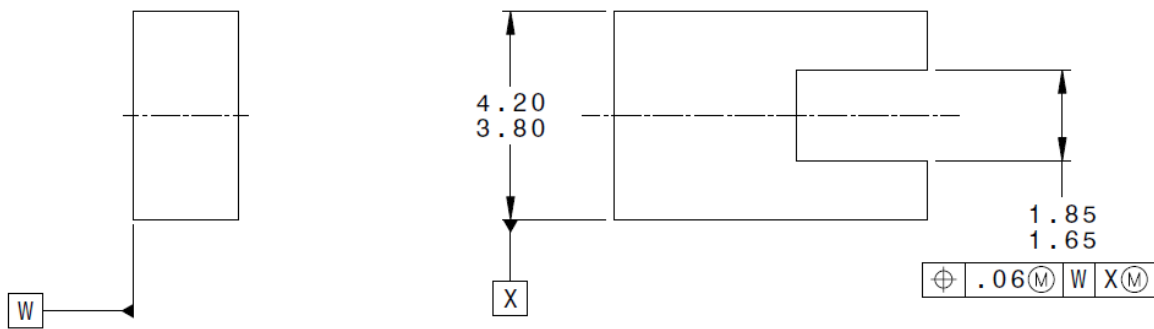
    a) .06
    b) .26
    c) .41
    d) .64

113) Runout tolerance controls variation in the parts surface _____

a) as seen on an optical comparator

b) with respect to a datum plane

c) as it is rotated 360° about a datum axis

d) as it is rotated 360° about a datum feature

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114) Runout can control the form, orientation or co-axiality of a surface if the _____.

a) geometric tolerance is larger than the feature size

b) geometric tolerance is the same as the feature size

c) geometric tolerance is smaller than the feature size

d) feature of size does not matter

115) Where the fasteners are of the same diameter and it is desired to use the same positional tolerance in each of the parts to be assembled, the following formula applies: _____.

a) T=(H-f)/2

b) T=H-F

c) T=H-F/2

d) T=H/2-F

116) When specifying the tangent plane (circle T) concept _____

a) a plane contacting the low points of a surface lie within two parallel planes

b) a plane contacting the high points of a surface shall lie within two parallel planes

c) it controls the flatness tighter than form does

d) it can only be applied to surfaces of size

117) Adding a secondary datum to the FRTZF in composite feature control frame controls the tolerance cylinders as a group and to be _____ as governed by the tolerance cylinders of PLTZF.

a) perpendicular to the primary and secondary datums

b) parallel to the primary and secondary datums

c) perpendicular to the primary datum and parallel to the secondary datum

d) perpendicular to the secondary datum and parallel to the primary datum.

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118) _____ an imperfect (abstract) plane formed by the center points of all line segments bounded by the feature.

    a) center plane
    b) median plane
    c) derived median plane
    d) datum plane

119) intended datum features are identified with datum _____, and the applicable datum references are included in the feature control frame.

a) feature symbols

b) callouts

c) targets

d) frames

120) when the hole patterns are located by composite positional tolerancing, actual feature axes must _____.

a) simultaneously lie within both tolerance zones

b) sometimes lie within both tolerance zones

c) never lie within both tolerance zones

d) simultaneously lie outside both tolerance zones

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121) if this part was manufactured and the inspection report came back stating that the hole size was .496" dia. and the axis location was .643" in the X direction and .527" in the Y direction, what would the actual axis position location of the hole be?
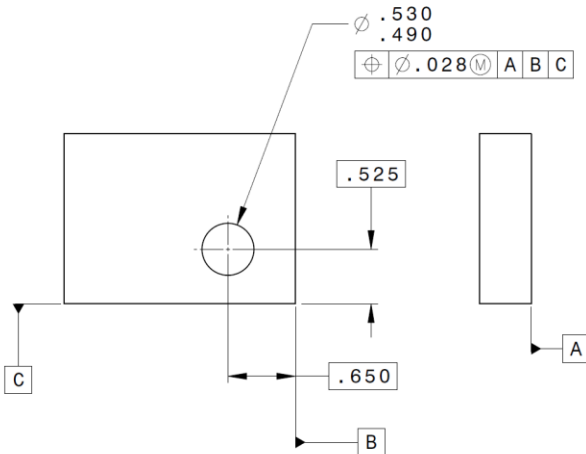
- a) .0100
- b) .0145
- c) .0200
- d) .0210

122) when positioning a hole to a boss using positional tolerancing, specifying _____ would be a way to control the minimum wall thickness while allowing the greatest tolerance.

a) MMC

b) RFS

c) LMC

d) None of the above

123) when a tolerance of position or orientation is applied to a feature on a zero tolerance at MMC basis and produced feature has departed from MMC, the tolerance is totally dependent on the feature's_____

- a) MMC size
- b) Actual mating size
- c) LMC size
- d) Nominal size

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124) when identical positional tolerances are specified, the _____ between any two holes will be the same for chain or baseline dimensioning.

A) resultant condition

b) true position

c) geometric tolerance

d) bilateral tolerance

125) multiple patterns of features located by basic dimensions relative to common datum structures apply with a simultaneous requirement on a _____

a) RMB basis when the datum features are not subject to size tolerances unless we apply a notation such as SEP REQT beneath each feature control frame.

b) RMB basis when datum features are not subject to size tolerances.

c) MMB basis when a notation such as SEP REQT is applied beneath each feature control frame.

d) MMB basis when a notation such as BOUNDARY is applied beneath each feature control frame.

126) When referencing a datum feature at MMC for a pattern, the relative shift of the pattern of features, as a group, with respect to the axis of the datum features, _____ affect the position tolerance of the features relative to one another in the pattern.

a) will always

b) does not

c) may

d) can adversely

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127) a worst-case boundary generated by the largest feature (LMC for an internal feature and MMC for an external feature) plus the stated geometric tolerance and any additional geometric tolerance (if applicable) resulting from the feature's departure from its specified material condition.

a) virtual condition

b) resultant condition

c) inner boundary

d) outer boundary

128) when more than one datum feature is used to establish a single datum the features are called _____

a) common datum features

b) complex datum features

c) compound datum features

d) multiple datum features

129) A datum reference frame exists _____

a) on the inspection equipment

b) on the process equipment

c) only in theory

d) on the part

130) _____a similar perfect feature counterpart expanded within an internal feature(s) or contracted about an external feature(s) while constrained either in orientation or location or both to the applicable datum(s).

a) related actual minimum material envelope

b) unrelated actual minimum material envelope

c) related actual mating envelope

d) actual mating envelope

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131) Runout is a composite tolerance used to control the functional relationship of one or more features of a part to a _____

a) datum axis

b) datum surface

c) centerline

d) median axis

132) _____ a similar perfect feature(s) counterpart of largest size that can be expanded within an external feature(s) or smallest size that can be contracted
about an internal feature(s) so that it coincides with the surface(s) at the lowest points.

a) actual mating size

b) actual local size

c) actual mating envelope

d) actual minimum mating envelope

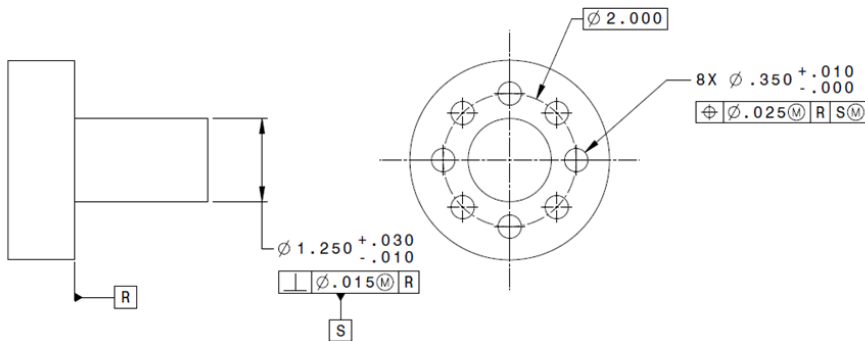133) when applied to planar surfaces, angularity, perpendicularity, and parallelism also control _____.

   a) Size
   b) Position
   c) Flatness
   d) Location

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USE THIS FIGURE TO ANSWER QUESTIONS 134 and 135.

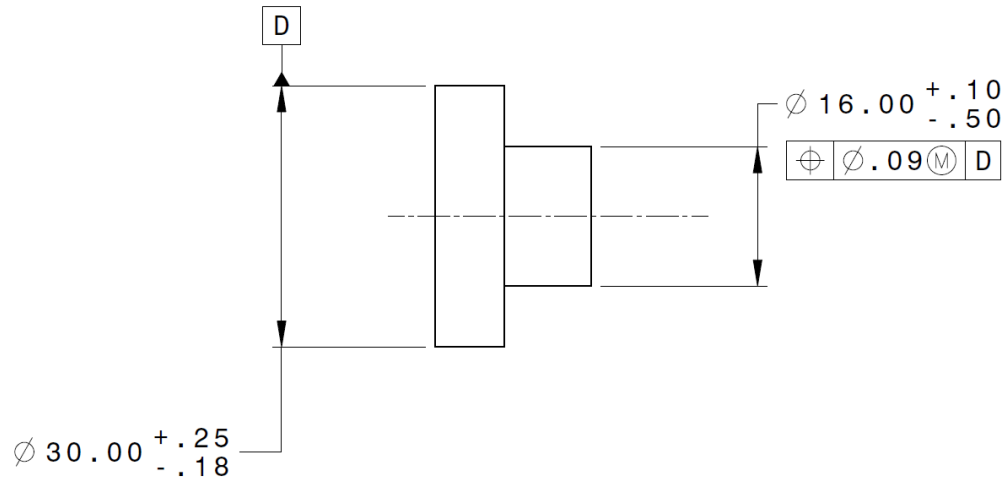134. Calculate the ring gage size used for the datum feature simulator.

A) 1.280

b) 1.295

c) 1.225

d) 1.240

135) calculate the gage pin size that would be used to inspect the holes.
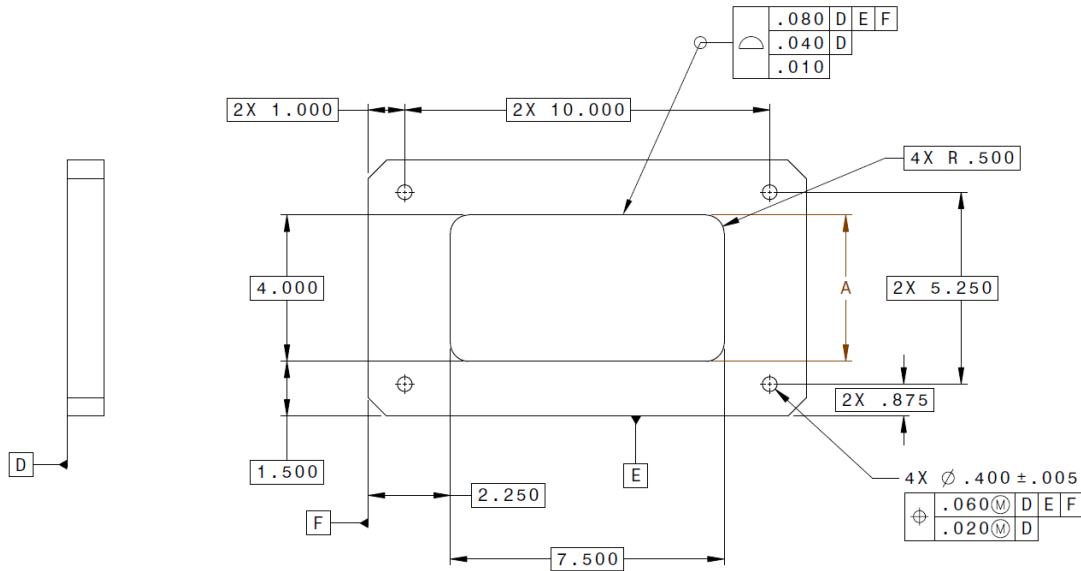
a) .325

b) .360

c) .350

d) .315

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136. What is the max coaxial radial displacement allowed for the feature?

D

$\emptyset 16.00 ^{+.10}_{-.50}$

| ⊕ | $\emptyset.09$Ⓜ | D |

$\emptyset 30.00 ^{+.25}_{-.18}$

    a) .69
    b) .56
    c) .32
    d) .21

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Use this figure to answer questions 137, 138, 139

137) Based on the specified profile location control, the inner and outer boundary for the dimension labeled A is _____.

a) 3.870 and 4.130

b) 3.090 and 4.010

c) 3.060 and 4.040

d) 3.020 and 4.080

138) Two functional gages must be designed to verify the location of the four holes. The required gage pin sizes for each of the gages are _____.

a) Φ3.335 and 3.375

b) Φ3.395 and 3.375

c) Φ3.335 and 3.395

d) Φ3.890 and 3.930

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139) What is the maximum height of the internal feature can be for the dimension labeled A.

a) 4.050

b) 3.090

c) 4.010

d) 4.080

140) In the ASME Y14.5-2009 standard, the term "true geometric counterpart" has been replaced with _____ .

a) simulated datum

b) datum feature simulator

c) true geometric counterpart

d) actual mating counterpart

141) If a datum target is defined with basic dimensions, the tolerance for the datum target is_____.

a) additional to any geometric tolerance

b) established using tolling and gaging tolerances

c) not additional to any geometric tolerance

d) applied at 30% of the total tolerance allowed

142) Verifying hole patterns using positional tolerances at RFS requires

a) an easier setup

b) more complex setup

c) can be measured using virtual condition pins.

d) cannot be measured

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143) The drawing should define a part without specifying its manufacturing processes unless it's integral to the design.

a) True

b) False

144) The coordinate system on the drawing should be _____

a) left handed

b) right handed

c) not specified in the drawing

d) should only be allowed per design

145) Unless otherwise specified, all dimensional tolerance applies in the _____.

a) restrained condition

b) in the restrained condition unless otherwise specified

c) free state condition

d) free state condition unless otherwise specified.

146) The dimensions and tolerances applied on the drawing _____

a) only applies at the drawing and sub assembly level.

b) only applies at two detailed level drawings below.

c) only applies at that drawing level.

d) applies only at that level and the upper assembly level.

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147) The symbol for slope is _____.

a)

b)

c)

d)

148) When using statistical tolerances _____.

a) a note shall be placed on the drawing defining that the part shall be produced with statistical process control, or to the more restrictive arithmetic limits.
b) a note shall be placed on the drawing defining that the part shall be produced with statistical process control, and to the more restrictive arithmetic limits.
c) a note may be placed on the drawing defining that the part shall be produced with statistical process control, or to the more restrictive arithmetic limits.
d) a note may be placed on the drawing defining that the part shall be produced with statistical process control, and to the more restrictive arithmetic limits.

149) Circular/Total runout and concentricity maybe only be used on an _____ basis

a) MMC

b) LMC

c) RFS

d) MMC/LMC/RFS

145) Section 8 in the ASME Y14.5-2009 standard is titled_____.

a) Toleranced of Runout

b) Tolerances of Location

c) Tolerances of Profile

d) Toleranced of Orientation

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151) Where the datum reference frame are not specified in the lower segment of the composite feature control frame, the FRTZF _____

a) is free to rotate but not translate within the boundaries established and governed by the PLTZF.

b) is constrained in rotation but not free to translate within the boundaries established and governed by the PLTZF.

c) is constrained in rotation but free to translate within the boundaries established and governed by the PLTZF.

d) is free to rotate and translate within the boundaries established and governed by the PLTZF.

152) Cylindricity tolerances may also specify datums in the feature control frame.

a) true

b) false

c) only on a MMC basis

d) only on an RFS basis