Enrollment No......................................
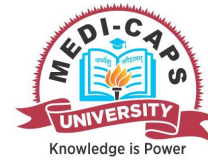
Faculty of Engineering

End Sem (Even) Examination May-2019

FT3C009 Building Planning and Machine Drawing

Programme: B.Tech.   Branch/Specialisation: FT

Duration: 3 Hrs.   **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. The angle which the stair makes with horizontal is called: **1**
(a) Rise   (b) Theta   (c) Pitch   (d) Stair angle

ii. Which of the following stair type is provided when going space is **1** very limited:
(a) Straight stairs   (b) Open-well stairs
(c) Spiral stairs   (d) Doglegged stair

iii. What is the bottom frame of a window called? **1**
(a) Foot rail   (b) Sill   (c) Bottom rail(d) Brace

iv. The types of buildings used for medical purpose or other treatment is **1**
(a) Institutional building   (b) Educational building
(c) Assembly building   (d) Mercantile building

v. If object is lying on picture plane, the apparent height of the object **1** in the perspective view will be _____ as that of true height of object.
(a) Larger   (b) Smaller   (c) Same   (d) None of these

vi. The pipe which carries discharges form urinals and water closets **1** only is called
(a) Soil pipe   (b) Waste pipe
(c) Vent pipe   (d) Anti-syphonage pipe

vii. Basic size is in _____ between lower and upper limits. **1**
(a) Half   (b) Equal
(c) One and half   (d) Double

viii.   _____ is equal to the differences of the two limits of size of the part   **1**
(a) Tolerance   (b) Low limit   (c) High limit   (d) Design size

ix.   Double-V and double-U butt welds are used for plates of thickness   **1**
(a) 1-5mm   (b) 5-10mm   (c) 10-15mm   (d) Over 15mm

x.   Length of bolt is specified as measured from   **1**
(a) Top of head to end of bolt
(b) Bottom of head to end of bolt
(c) Where the threads starts to end
(d) Bottom of head to start of threads

Q.2   i.   Define the following terms with free hand sketches.   **2**
(a) Landing   (b) Holdfast

ii.   What is a foundation? Enlist and explain the different three types of foundations with proper sketches.   **8**

OR   iii.   Enlist the different types of doors. Explain six of them briefly with neat sketches.   **8**

Q.3   i.   Enlist any four components of building.   **2**

ii.   How are buildings classified according to the NBC? Write all categories with proper examples.   **8**

OR   iii.   For a square plot of size 1600m², the owner allowed an equal setback of 3m on all the sides. Within the building lines thus formed, if he constructed a three-storey house (G+2) - with the upper storeys having equal area as the ground floor - what is the resultant F.A.R.? Assume wall area as 18% of the built-up area.   **8**

Q.4   i.   Define Perspective Drawing.   **4**

ii.   Describe the following with neat sketch.   **6**
(a) Vanishing point
(b) Two point perspective view
(c) One point perspective view

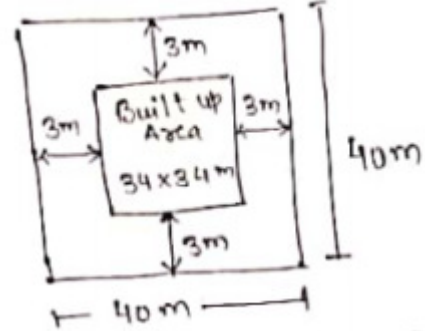OR   iii.   Write a short note on "Energy Efficient Buildings" with some examples in drawing.   **6**

Q.5   i.   Define limit, fit, tolerance and list types of fit?   **4**

ii   Calculate the limits, tolerances and allowances for a 20 mm shaft and hole pair designated H8 d8.   **6**
The standard tolerance is given by in micron, $i = 0.45 \sqrt[3]{D} + 0.001\,D$
Where, D is mean diameter varies from 18 mm to 24 mm.
Tolerance grade 8 is 25i
The fundamental deviation for fit d is given by $FD = -16D^{0.44}$

OR   ii.   Determine allowance and tolerances for the following dimensions of mating parts according to the hole basis system. State types of fit.   **6**

	Shaft	Hole
Diameter	27.470 mm	27.500 mm
Diameter	27.445 mm	27.523 mm

Q.6   i.   Define welding. Write any four drawing convention representation of welding joints   **4**

ii.   Draw three views of a hexagonal-headed bolt, 20mm diameter and 100 mm long. Dimensions are for Hexagonal nut and bolt are given: **6**

Thickness of the nut,	T = D
Distance across diagonally opposite corners	2D
Angle of chamfer	30°
Radius of chamfer	R = 1.5D

OR   iii.   Explain any three types of foundation bolt with neat sketches.   **6**

*****

Q.1   i.   The angle which the stair makes with horizontal is called: **1**
          (c) Pitch

      ii. Which of the following stair type is provided when going space is   **1**
           very limited:
           (c) Spiral stairs

      iii. What is the bottom frame of a window called?   **1**
           (c) Bottom rail

      iv. The types of buildings used for medical purpose or other treatment is   **1**
           (a) Institutional building

      v.   If object is lying on picture plane, the apparent height of the object   **1**
           in the perspective view will be _____ as that of true height of
           object.
           (c) Same

      vi. The pipe which carries discharges form urinals and water closets   **1**
           only is called
           (a) Soil pipe

      vii. Basic size is in _____ between lower and upper limits.   **1**
           (a) Half

      viii. _____ is equal to the differences of the two limits of size of the part   **1**
           (a) Tolerance

      ix. Double-V and double-U butt welds are used for plates of thickness   **1**
           (d) Over 15mm

      x.   Length of bolt is specified as measured from   **1**
           (b) Bottom of head to end of bolt

Q.2   i.   Define the following terms with free hand sketches.   **2**
           (a) Landing   1 mark
           (b) Holdfast   1 mark

      ii. Foundation   2 marks   **8**
           Three types of foundations with sketches.   6 marks

OR   iii. Types of doors   2 marks   **8**
           Six of them with sketches   6 marks

Q.3   i.   Any four components of building.   **2**
           0.5 mark for each   (0.5 mark * 4)

ii.   Classification with examples according to the NBC   **8**
      1 mark for each   (1 mark * 8)

OR   iii. Plot size = 1600m² = 40 x 40 m   **8**
            Set back allowed (from all sides) = 3 m   1 mark
            Total build up area = (40 – 6) x (40 x 6)

                                                         1 mark
      Excluding wall area as 18 % of build up area
      Wall are = $\frac{18}{100} \times 1156 = 208.88 \ m^2$
      Floor area = 1156 – 208.88 = 947.12   2 marks
      Building constructed is three storey building
      So, total floor area   = 3 × 947.12 m^2
                               = 2041.36 m^2 2 marks
      FAR = $\frac{Total\ Cloor\ area}{Plot\ area} = \frac{2841.36}{1600} = 1.77$ 2 marks

Q.4   i.   Perspective Drawing.   **4**
      ii. Describe the following with neat sketch.   **6**
           (a) Vanishing point   2 marks
           (b) Two point perspective view   2 marks
           (c) One point perspective view   2 marks

OR   iii. Energy Efficient Buildings   **6**

Q.5   i.   Define limit   1 mark   **4**
           Fit   1 mark
           Tolerance   1 mark
           List types of fit   1 mark

      ii   Calculate the limits, tolerances and allowances for a 20 mm shaft and   **6**
           hole pair designated H8 d8.
           D is mean diameter varies from 18 mm to 24 mm. There fore, the
           value of D is $(18x24)^{1/2}$

D = 20.80 mm

The standard tolereance unit is $i = 0.45 \sqrt[3]{D} + 0.001 D$

$$i = 0.45 \sqrt[3]{20.80} + 0.021$$
$$= 1.28 \text{ micron} \qquad \text{1 mark}$$

For hole of quality 8, the standard tolerance, 25i = 0.032 mm.

For the H hole the FD = 0

Hence the hole limit are 20 mm and 20 + 0.032 = 20.032 mm

Therefore, hole tolerance = 20.032 – 20 = .032 mm

for shaft of quality 8, the standard tolerance = 25i = 25x 1.28 = 0.032 mm

for d shaft the FD = $-16D^{0.44}$ = - 0.061 mm   1 mark

Shaft limit

UL   =   20.000 – 0.061 = 19.939 mm   1 mark

LL   = 20- (0.061 + 0.032) = 19.907 mm   1 mark

Shaft tolerance = 19.939 – 19.907 = 0.032 mm   1 mark

Minimum allowance   = 0.061 mm.   1 mark

The standard tolerance is given by in micron, $i = 0.45 \sqrt[3]{D} + 0.001 D$

Where, D is mean diameter varies from 18 mm to 24 mm.

Tolerance grade 8 is 25i

The fundamental deviation for fit d is given by FD = $-16D^{0.44}$

OR   ii.   Determine allowance and tolerances for the following dimensions of mating parts according to the hole basis system. State types of fit.   **6**

```
          Shaft                    Hole
(a)  ø 27.470  mm        ø  27.500  mm
     ø 27.445  mm        ø  27.523  mm
(i)  Hole tolerance   = Upper  limit – Lower  limit
                      = 27.523 – 27.500
                      = 00.023  mm.
(ii) Shaft tolerance  = Upper  limit – Lower  limit
                      = 27.470 – 27.445
                      = 00.025  mm.
(iii) Allowance       = Lower  limit of hole – Upper  limit  of  shaft
                      = 27.500 – 27.470
                      = 00.030  mm.
This is clearance  fit.
```

Q.6   i.   Define welding.   2 marks   **4**

Any four drawing convention representation of welding joints

0.5 mark for each convention (0.5 mark * 4)   2 marks

ii.   Draw three views of a hexagonal-headed bolt,   **6**

Front View   3 marks

Side view   1 mark

Top view   2 marks

OR   iii.   Any three types of foundation bolt with sketches.   **6**

2 marks for each type   (2 marks * 3)

*****