Series &RQPS

SET-4

प्रश्न–पत्र कोड
Q.P. Code 68

रोल नं.
Roll No.

परीक्षार्थी प्रश्न–पत्र कोड को उत्तर–पुस्तिका के मुख–पृष्ठ पर अवश्य लिखें ।
Candidates must write the Q.P. Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न–पत्र में मुद्रित पृष्ठ **23** हैं ।
- कृपया जाँच कर लें कि इस प्रश्न–पत्र में **23** प्रश्न हैं ।
- प्रश्न–पत्र में दाहिने हाथ की ओर दिए गए प्रश्न–पत्र कोड को परीक्षार्थी उत्तर–पुस्तिका के मुख–पृष्ठ पर लिखें ।
- **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर–पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।**
- इस प्रश्न–पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न–पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक परीक्षार्थी केवल प्रश्न–पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर–पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।
- Please check that this question paper contains **23** printed pages.
- Please check that this question paper contains **23** questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.

इंजीनियरी ग्राफ़िक्स
ENGINEERING GRAPHICS

*निर्धारित समय : **3** घण्टे*
*Time allowed : **3** hours*

*अधिकतम अंक : **70***
*Maximum Marks : **70***

सामान्य निर्देश :

(i) ***सभी** प्रश्नों के उत्तर दीजिए ।*

(ii) *यदि आवश्यक हो, तो ड्राइंग शीट के दोनों पक्षों का प्रयोग करें ।*

(iii) *सभी परिमाप मिलीमीटर में हैं ।*

(iv) *यदि कोई पैमाइश अनुपस्थित या असंगत हो, तो उसके लिए उपयुक्त मान की कल्पना की जाए ।*

(v) *एस.पी.:46-2003 संशोधित कोड (प्रक्षेपण के प्रथम कोण विधि के साथ) का पालन करें ।*

(vi) *प्रश्न **21** के किसी भी दृश्य में छिपे किनारों अथवा रेखाओं की आवश्यकता नहीं है ।*

(vii) *प्रश्न **23** में अछेदित दृश्यों में छिपे किनारों अथवा रेखाओं को दिखाएँ ।*

खण्ड – क **20 × 1 = 20**

प्र.–1 से प्र.–20 : निम्नलिखित बहुविकल्पीय प्रश्नों के उत्तर दीजिए । सही उत्तर अपनी ड्राइंग शीट पर आलेखित कीजिए ।

1. सचित्र प्रक्षेपण के तीन रूप हैं
   (A) परोक्ष, परिप्रेक्ष्य और रेखीय
   (B) अक्षमितीय, परोक्ष और परिप्रेक्ष्य
   (C) परिप्रेक्ष्य, रेखीय और तिरछा
   (D) अक्षमितीय, समायोजित और समकक्ष

2. यदि एक सममितीय रेखांकन में सममितीय पैमाने का उपयोग किया जाता है तब रेखांकन कहलाता है _____
   (A) सममितीय दृश्य (B) सममितीय प्रक्षेप
   (C) लम्बकोणीय दृश्य (D) अनुभागीय दृश्य

3. लम्बकोणीय प्रक्षेप में यदि एक वस्तु द्वितीय चतुर्भाग में स्थित है, उसकी स्थिति उस प्लेन के संदर्भ में होगी
   (A) वी.पी. के सामने और एच.पी. के नीचे (B) वी.पी. के पीछे और एच.पी. के ऊपर
   (C) वी.पी. के सामने और एच.पी. के ऊपर (D) वी.पी. के पीछे और एच.पी. के नीचे

4. _____ के साथ रेखांकन सममितीय है ।
   (A) कम किये हुए पैमाने (B) वास्तविक पैमाने
   (C) वर्नीयर पैमाने (D) सममितीय पैमाने

General Instructions :

(i) *Attempt **all** the questions.*

(ii) *Use both sides of drawing sheet, if necessary.*

(iii) *All dimensions are in millimetres.*

(iv) *Missing and mismatching dimensions, if any, may be suitably assumed.*

(v) *Follow the SP:46-2003 revised codes (with first angle method of projection).*

(vi) *In no view of question 21, are hidden edges or lines required.*

(vii) *In question 23, hidden edges or lines are to be shown in views without section.*

SECTION – A

20 × 1 = 20

Q.1 to Q.20 : Answer the following multiple choice questions. Print the correct choice on your drawing sheet.

1. The three forms of pictorial projection are

(A) oblique, perspective and linear

(B) axonometric, oblique and perspective

(C) perspective, linear and skewed

(D) axonometric, offset and co-ordinate

2. If an isometric drawing is made by use of isometric scale then the drawing is called _____.

(A) Isometric view (B) Isometric projection

(C) Orthographic view (D) Sectional view

3. In orthographic projection, if an object lies in second quadrant, its position with respect to reference planes will be

(A) infront of V.P. and below H.P. (B) behind V.P. and above H.P

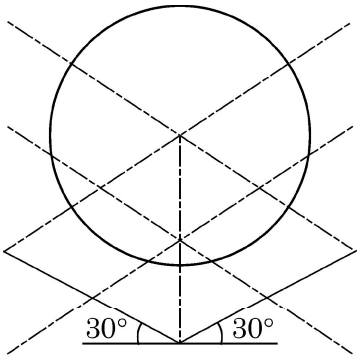
(C) infront of V.P. and above H.P. (D) behind V.P. and below H.P.

4. The isometric is the drawing with _____.

(A) Reduced scale (B) Actual scale

(C) Vernier scale (D) Isometric scale

5. दिये गये रेखाचित्र के लिये सही कथन चुनिए :



सममितीय प्रक्षेपण

(i) सममितीय प्रक्षेपण में गोले का व्यास छोटा कर दिया जाता है ।

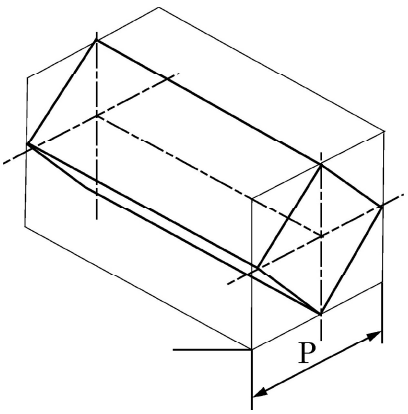
(ii) गोले का सममितीय प्रक्षेपण एक वृत्त है ।

(iii) गोले का सममितीय प्रक्षेपण एक दीर्घवृत्त है ।

(iv) गोले का व्यास सममितीय प्रक्षेपण में वही रहता है ।

(A) सिर्फ (i) और (iv)
(B) सिर्फ (ii) और (iv)
(C) सिर्फ (i) और (iii)
(D) सिर्फ (ii) और (iii)

6. दिये गये सममितीय प्रक्षेपण में 'P' के मान के संदर्भ में सही कथन को चुनिए ।



(i) 'P' प्रिज़्म की दी गई लम्बाई के बराबर है ।

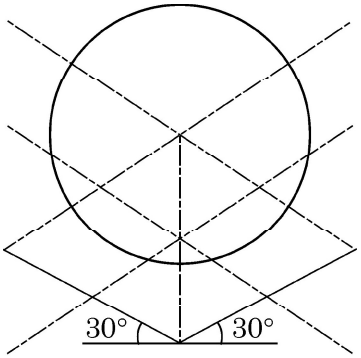
(ii) 'P' प्रिज़्म के दिये गये अंत किनारे के बराबर नहीं है ।

(iii) 'P' लम्बकोणीय मदद करने वाले दृश्य से प्राप्त होगा ।

(iv) 'P' को किसी भी अंक के रूप में माना जा सकता है ।

(A) केवल (i) और (ii)
(B) केवल (i) और (iii)
(C) केवल (ii) और (iii)
(D) केवल (ii) और (iv)

5. Select the correct statements for the given figure :



Isometric Projection

(i) The diameter of sphere in isometric projection, is foreshortened.

(ii) The isometric projection of sphere is a circle.

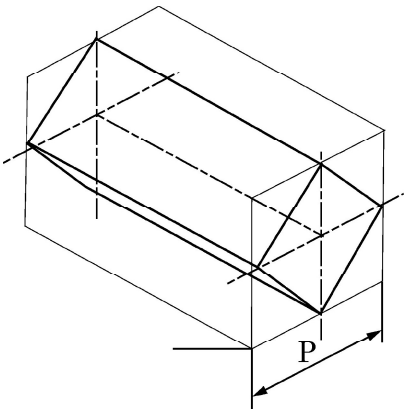
(iii) The isometric projection of sphere is an ellipse.

(iv) The diameter of sphere in isometric projection remains same.

(A) (i) and (iv) only (B) (ii) and (iv) only

(C) (i) and (iii) only (D) (ii) and (iii) only

6. Select the correct statements, regarding the value of 'P' in the given isometric projection.



(i) 'P' is equal to the given length of the prism.

(ii) 'P' is not equal to the given end edge of the prism.

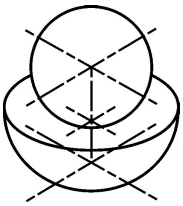
(iii) 'P' will be obtained from the orthographic helping view.

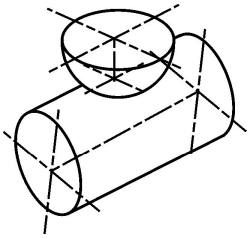
(iv) 'P' can be assumed as any numeral.

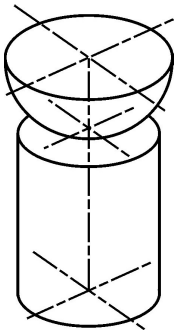
(A) (i) and (ii) only (B) (i) and (iii) only

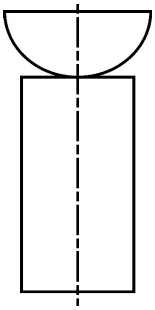
(C) (ii) and (iii) only (D) (ii) and (iv) only

7. एक सीधे बेलन के ऊपर एक गोलार्ध स्थित है । सही विकल्प चुनिए जो सममितीय प्रक्षेपण प्रदर्शित करता है ।

(i) 

(ii) 

(iii) 

(iv) 

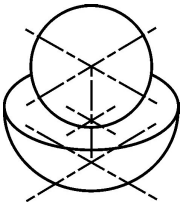
(A) (i)

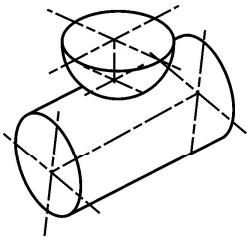
(B) (ii)

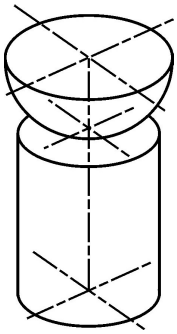
(C) (iii)

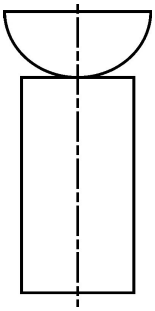
(D) (iv)

7. A hemisphere placed on top of a vertical cylinder. Select the correct option which represents the isometric projection.

(i) 

(ii) 

(iii) 

(iv) 

(A) (i)

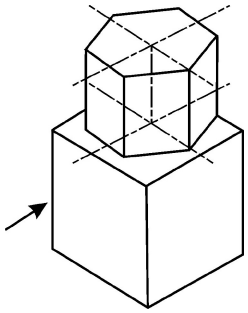
(B) (ii)

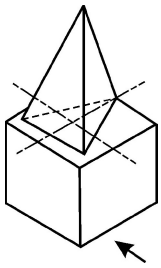
(C) (iii)

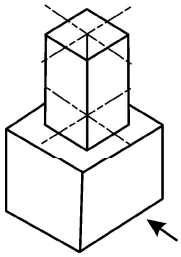
(D) (iv)

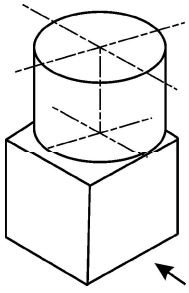
8. सूची – I का सूची – II के साथ मिलान कीजिए :

सूची – I
ठोस का सममितीय प्रक्षेपण

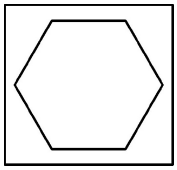
1. 

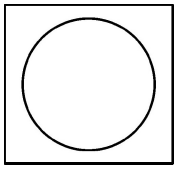
2. 

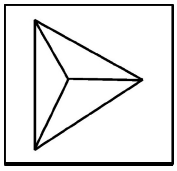
3. 

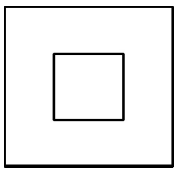
4. 

सूची – II
लंबकोणीय प्रक्षेप में शीर्ष दृश्य
(आकृति पैमाने के अनुसार नहीं हैं)

(i) 

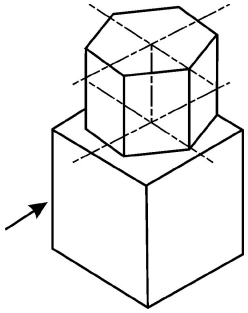
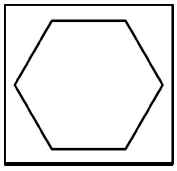
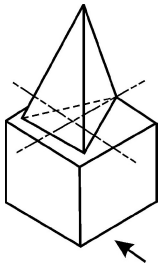
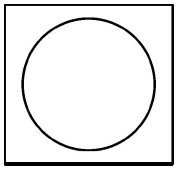
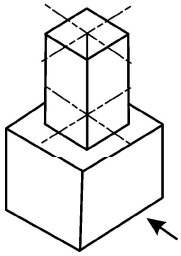
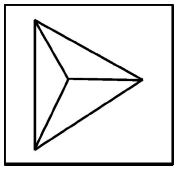
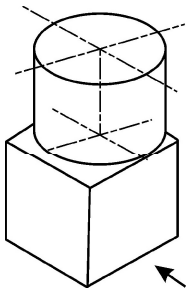
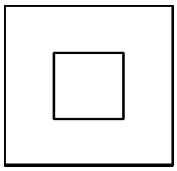
(ii) 

(iii) 

(iv) 

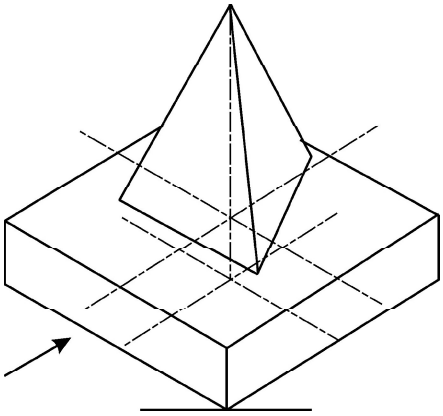
	1	2	3	4
(A)	(i)	(iii)	(ii)	(iv)
(B)	(ii)	(iv)	(iii)	(i)
(C)	(ii)	(i)	(iv)	(iii)
(D)	(i)	(iii)	(iv)	(ii)

8. Match the List – **I** with List – **II** :

List – I **Isometric projection of solids**		**List – II** **Top view in orthographic projection (Figure not to scale)**	
1.		(i)	
2.		(ii)	
3.		(iii)	
4.		(iv)	

	1	2	3	4
(A)	(i)	(iii)	(ii)	(iv)
(B)	(ii)	(iv)	(iii)	(i)
(C)	(ii)	(i)	(iv)	(iii)
(D)	(i)	(iii)	(iv)	(ii)

9. दिये गये ठोसों के संयोजन के सममितीय प्रक्षेपण के लिये सही कथन/कथनों को चुनिए :



(i) ठोस कुछ इस तरह से रखे हैं कि प्रिज्म का एक आधार किनारा और पिरामिड के दो आधार किनारे वी.पी. के समानांतर हैं ।

(ii) ठोस कुछ इस तरह रखे हैं कि प्रिज्म का एक आधार किनारा और पिरामिड के दो आधार किनारे वी.पी. के लंबवत् हैं ।

(iii) ठोस कुछ इस तरह रखे हैं कि प्रिज्म के दो समानांतर आधार किनारे और पिरामिड का एक आधार किनारा वी.पी. के लंबवत् हैं ।

(iv) ठोस कुछ इस तरह रखे हैं कि प्रिज्म के दो समानांतर आधार किनारे और पिरामिड का एक आधार किनारा वी.पी. के समानांतर हैं ।

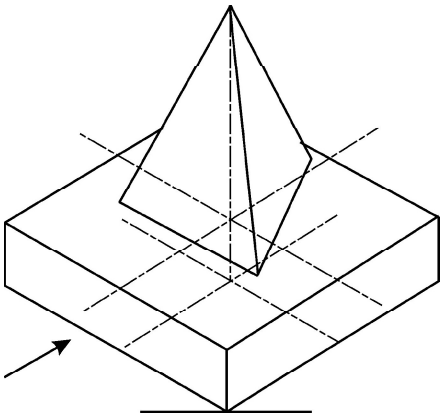
(A) केवल (i) और (ii)

(B) केवल (iii)

(C) केवल (iv)

(D) केवल (ii) और (iv)

9. Select the correct statement/s for the given isometric projection of combination of solids :



(i) The solids are kept in such a way that one of the base edges of the prism and two of the base edges of the pyramid are parallel to V.P.

(ii) The solids are kept in such a way that one of the base edges of the prism and two of the base edges of the pyramid are perpendicular to V.P.

(iii) The solids are kept in such a way that two of the parallel base edges of prism and one of the base edges of pyramid are perpendicular to V.P.

(iv) The solids are kept in such a way that two of the parallel base edges of prism and one of the base edges of pyramid are parallel to V.P.

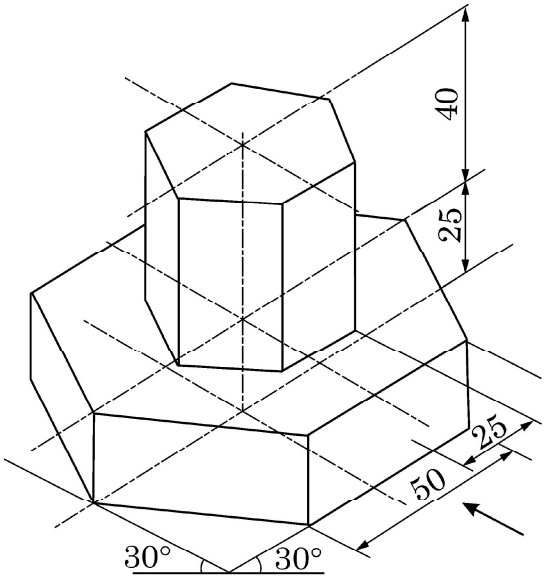
(A) (i) and (ii) only

(B) (iii) only

(C) (iv) only

(D) (ii) and (iv) only

10. दिये गये ठोसों के संयोजन के सममितीय प्रक्षेपण के लिये सूची – I का सूची – II के साथ मिलान कीजिए :

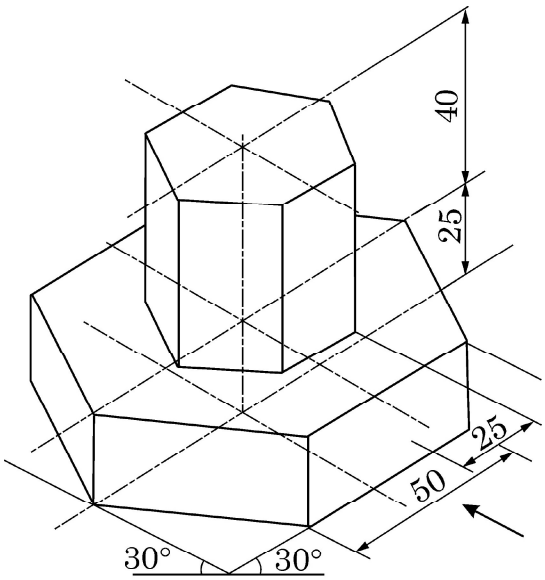


सममितीय प्रक्षेपण

सूची – I	**सूची – II**
1. षट्भुजाकार फलकों की कुल संख्या	(i) वी.पी. के लंबवत्
2. आयताकार फलकों की कुल संख्या	(ii) एच.पी. के लंबवत्
3. दोनों ठोसों के आधार	(iii) बारह
4. दोनों ठोसों के अक्ष	(iv) चार

	1	2	3	4
(A)	(iv)	(iii)	(i)	(ii)
(B)	(iii)	(iv)	(ii)	(i)
(C)	(ii)	(i)	(iii)	(iv)
(D)	(i)	(ii)	(iv)	(iii)

10. Match the List – **I** with List – **II**, for the given isometric projection of combination of solids :

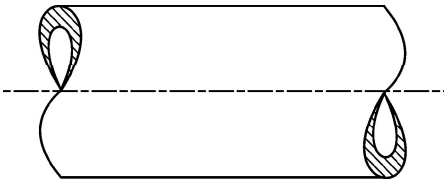
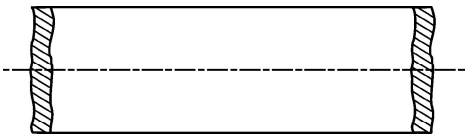
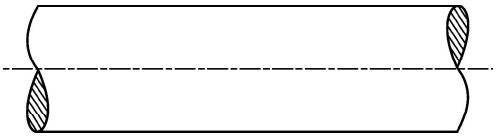
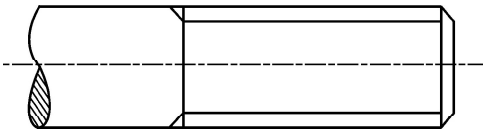


Isometric Projection

	List – I		**List – II**
1.	Total number of hexagonal faces	(i)	Perpendicular to V.P.
2.	Total number of rectangular faces	(ii)	Perpendicular to H.P.
3.	Bases of both solids	(iii)	Twelve
4.	Axes of both solids	(iv)	Four

	1	2	3	4
(A)	(iv)	(iii)	(i)	(ii)
(B)	(iii)	(iv)	(ii)	(i)
(C)	(ii)	(i)	(iii)	(iv)
(D)	(i)	(ii)	(iv)	(iii)

11. सूची – I का सूची – II के साथ मिलान कीजिए :

सूची – I पारंपरिक प्रतिरूप		सूची – II पुर्जे
1.		(i) वर्गाकार अनुप्रस्थ-काट की छड़
2.		(ii) पाइप
3.		(iii) गोल छड़ बाहरी चूड़ी के साथ
4.		(iv) गोल छड़ बिना चूड़ी के

1 2 3 4

(A) (i) (iv) (iii) (ii)

(B) (ii) (iii) (iv) (i)

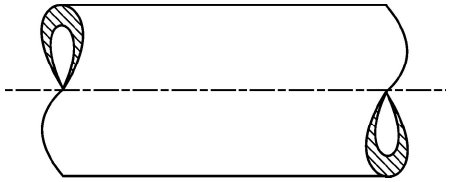
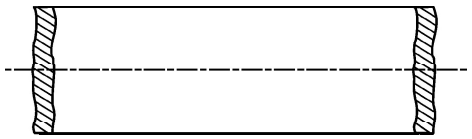
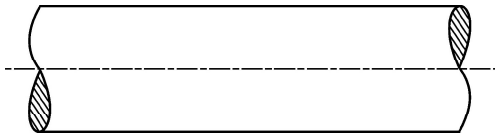
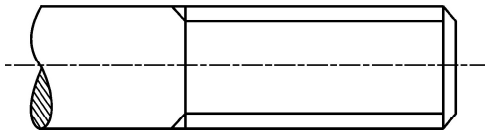
(C) (iv) (i) (ii) (iii)

(D) (ii) (i) (iv) (iii)

12. गिब और कॉटर ज्वाइंट में यदि कॉटर की मोटाई 8 मिमी है, तब गिब की मोटाई होगी

(A) 8 मिमी (B) 6 मिमी (C) 4 मिमी (D) 2 मिमी

11. Match the List – **I** with List – **II** :

List – I	**List – II**
Conventional representation	**Components**
1. 	(i) rods of square cross-section
2. 	(ii) pipes
3. 	(iii) round rod with external threads
4. 	(iv) round rod without thread

1 2 3 4

(A) (i) (iv) (iii) (ii)

(B) (ii) (iii) (iv) (i)

(C) (iv) (i) (ii) (iii)

(D) (ii) (i) (iv) (iii)

12. In a gib and cotter joint, if the thickness of cotter is 8 mm, then the thickness of gib will be

(A) 8 mm (B) 6 mm (C) 4 mm (D) 2 mm

13. टाई रॉड ज्वाइंट में रॉड बाहर से चूड़ीदार होती हैं और गोलाकार बॉडी में छिद्र _____ चूड़ीदार होते हैं ।

(A) आंतरिक (B) बाहरी (C) स्पर्शरेखीय (D) समवर्ती

14. लीड पूरे _____ चक्कर में अक्षीय दिशा में नट या बोल्ट द्वारा तय की गई दूरी होती है ।

(A) तीन (B) आधे (C) दो (D) एक

15. एक सीधे षट्भुजाकार नट में चेम्फरिंग दिखाई देती है जैसे _____ सम्मुख दृश्य में और _____ ऊपरी दृश्य में ।

(A) चतुर्थ भाग, रेखाएँ (B) चाप, वृत्त

(C) रेखाएँ, चतुर्थ भाग (D) वृत्त, चाप

प्र.–16 से प्र.–20 : निम्नलिखित अनुच्छेद को पढ़िए और नीचे दिए गए प्रश्नों के उत्तर दीजिए :

आकाश एक ऑटोमोबाइल स्पेअर पार्टस की दुकान में बतौर सहायक के रूप में शामिल हुआ । काम के पहले दिन सुपरवाइजर ने उसे छोटे मशीन पुर्जों को अलग एक रेक में रखने को कहा । आकाश ने प्रत्येक छोटे पुर्जे को उनकी सामान्य विशेषताओं के आधार पर वर्गीकृत किया । उसने बिना सिर (हेड) के बेलनाकार क्रॉस–सेक्शन वाले मशीन पुर्जो का एक समूह बनाया । उसने यह भी देखा कि उस समूह के सभी मशीन पार्ट्स में दोनों सिरों पर चूड़ी के साथ विभिन्न प्रकार की मध्य स्थिति थी । ये मशीन पुर्जे स्टॅड्स कहलाते हैं ।

16. ऊपरी दृश्य में एक सीधे स्टॅड में बाहरी चूड़ी को प्रदर्शित किया जाता है

(A) दोनों दीर्घ और लघु व्यास वृत्त को अधूरे वृत्त के जैसे

(B) दोनों दीर्घ और लघु व्यास वृत्त को पूर्ण वृत्त जैसे

(C) दीर्घ व्यास वृत्त एक पूर्ण वृत्त जैसे और लघु व्यास वृत्त को एक अधूरे वृत्त जैसे

(D) दीर्घ व्यास वृत्त एक अधूरे वृत्त जैसे और लघु व्यास वृत्त एक पूर्ण वृत्त जैसे

17. _____ का उपयोग किया जाता है जहाँ बोल्ट हेड के लिये पर्याप्त स्थान उपलब्ध ना हों ।

(A) कॉलर रॉड (B) CSK रिवेट (C) स्टॅड (D) CSK स्क्रू

18. एक 30 मिमी व्यास कॉलर स्टॅड में कॉलर की मोटाई है

(A) 12 मिमी (B) 30 मिमी (C) 45 मिमी (D) 66 मिमी

13. The rods in a tie rod joint are externally threaded and the holes in the cylindrical body are _____ threaded.

(A) internally (B) externally (C) tangentially (D) concurrently

14. Lead is the distance moved by a nut or bolt in the axial direction in _____ complete rotation.

(A) three (B) half (C) two (D) one

15. In a vertical hexagonal nut, the chamfering is seen as _____ in front view and _____ in top view.

(A) quadrant, lines (B) arcs, circle

(C) lines, quadrant (D) circle, arcs

Q. 16 to Q. 20 : Read the following paragraph and answer the questions given below :

Akash joined as a helper in an automobile spare parts shop. On his first day of work, the supervisor told him to segregate the small machine parts kept in a rack. Akash categorised each small part based on its common feature. He made one group of machine parts having body of cylindrical cross-section without head. He also observed that all the machine parts in that group had different types of central portion with threads on both ends. These machine parts are known as studs.

16. In top view external thread of a vertical stud is represented by

(A) both major and minor diameter circles as incomplete circles.

(B) both major and minor diameter circles as complete circles.

(C) major diameter circle as a complete circle and minor diameter circle as an incomplete circle.

(D) major diameter circle as an incomplete circle and minor diameter circles as a complete circle.

17. _____ is used where sufficient space for bolt head is not available.

(A) Collar rod (B) CSK rivet (C) Stud (D) CSK screw

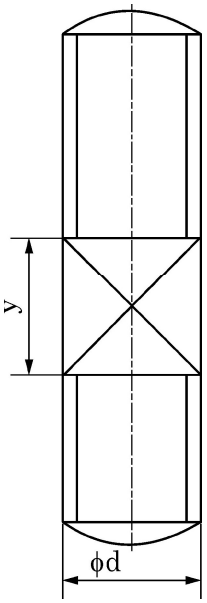
18. The thickness of collar in a collar stud of 30 mm diameter is

(A) 12 mm (B) 30 mm (C) 45 mm (D) 66 mm

19. स्क्वेयर नेक स्टॅड और कॉलर स्टॅड के अलावा _____ तीसरे प्रकार का स्टॅड है ।

(A) पाइप स्टॅड (B) रिम स्टॅड (C) सॉकेट स्टॅड (D) प्लेन स्टॅड

20. यदि एक स्क्वेयर नेक स्टॅड का व्यास 20 मिमी है, तब रेखाचित्र में 'y' का मान है



(A) 16 मिमी (B) 20 मिमी (C) 43 मिमी (D) 46 मिमी

खण्ड – ख

21. (A) एक सममितीय पैमाने को बनाइए । **5**

(B) एक पंचभुज प्रिज्म (आधार-भुजा 25 मिमी, ऊँचाई 50 मिमी) अपने आधार से एच.पी. पर स्थित है, का सममितीय प्रक्षेपण रेखांकित कीजिए । इसका एक आधार किनारा वी.पी. के समानांतर और उससे दूर है । अक्ष वी.पी. के समानांतर और एच.पी. के लंबवत् है । देखने की दिशा को इंगित कीजिए । सभी आयाम दीजिए । **10**

22. (A) बढ़े हुए पिच को 60 मिमी लेते हुए **नकल थ्रेड (knuckle thread)** का मानक प्रोफाइल 1 : 1 मापनी में बनाइए । मानक आयाम दीजिए । **8**

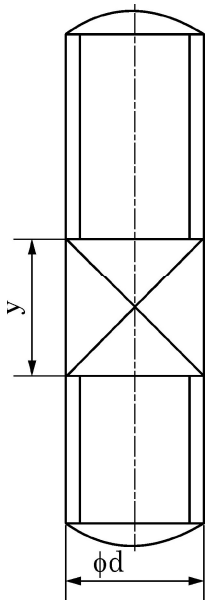
अथवा

(B) एक **स्क्वेयर हेडेड बोल्ट (square headed bolt)** का सम्मुख दृश्य और बायाँ पार्श्व दृश्य 1 : 1 की मापनी में बनाइए । अक्ष को वी.पी. और एच.पी. दोनों के समानांतर रखिये । बोल्ट का सांकेतिक व्यास 20 मिमी और बोल्ट की लम्बाई 80 मिमी लीजिए । मानक आयाम दीजिए ।

19. Apart from stud with square neck and collar stud, _____ is the third type of stud.

(A) pipe stud (B) rim stud (C) socket stud (D) plain stud

20. If 20 mm is the diameter of a stud with square neck, then the value of 'y' in the figure is



(A) 16 mm (B) 20 mm (C) 43 mm (D) 46 mm

SECTION – B

21. (A) Construct an isometric scale. **5**

(B) Draw the isometric projection of a pentagonal prism (base edge 25 mm, height 50 mm) is resting on its base on H.P. One of its base edges is parallel to V.P. and away from it. The axis is parallel to V.P. and perpendicular to H.P. Indicate the direction of viewing. Give all the dimensions. **10**

22. (A) Draw to scale 1 : 1, the standard profile of **knuckle thread** taking enlarged pitch 60 mm. Give standard dimensions. **8**

OR

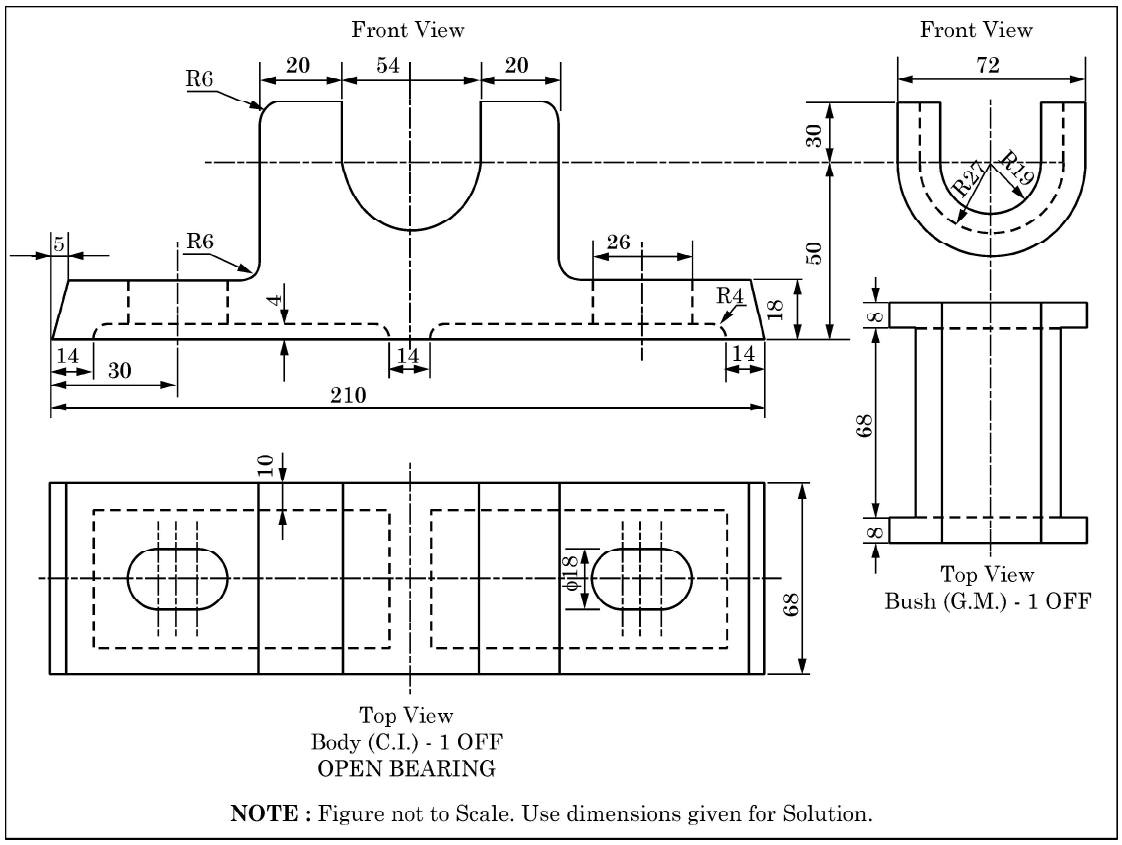
(B) Draw to scale 1 : 1, the front view and left side view of a **square headed** bolt. Keep the axis parallel to both V.P. and H.P., take the nominal diameter of bolt as 20 mm and length of bolt as 80 mm. Give standard dimensions.

23. (A) चित्र-1 में एक **ओपन बियरिंग (Open Bearing)** के पुर्जों का विवरण दिखाया गया है । इसके सभी पुर्जों को सही रूप से एकत्रित करके 1 : 1 की मापनी में इसके निम्नलिखित दृश्यों को बनाइए :

(i) दायाँ अनुभागीय सम्मुख दृश्य **13**

(ii) बायाँ पार्श्व दृश्य **8**

शीर्षक तथा प्रयुक्त मापनी आलेखित कीजिए । प्रक्षेप चिह्न बनाइए । 6 महत्वपूर्ण विमाएँ दीजिए । **6**



NOTE : Figure not to Scale. Use dimensions given for Solution.

चित्र-1

अथवा

(B) चित्र-2 में एक **बुश बियरिंग (Bush Bearing)** के संगृहित दृश्य को दिखाया गया है । इसके पुर्जों को ठीक से अलग करके इसके निम्नलिखित पुर्जों के निम्नलिखित दृश्यों को 1 : 1 की मापनी में बनाइए । बॉडी और बुश की एच.पी. और वी.पी. के संबंध में स्थिति वही रखिए ।

(i) बॉडी (Body)

(a) पूर्ण अनुभागीय सम्मुख दृश्य **8**

(b) बायाँ पार्श्व दृश्य **7**

23. (A) Fig. 1 shows the details of the parts of an **Open Bearing**. Assemble all these parts correctly and then draw to scale 1 : 1 its following views :

(i) Front view, right half in section. **13**

(ii) Left side view **8**

Print the title and scale used. Draw the projection symbol. Give 6 important dimensions. **6**

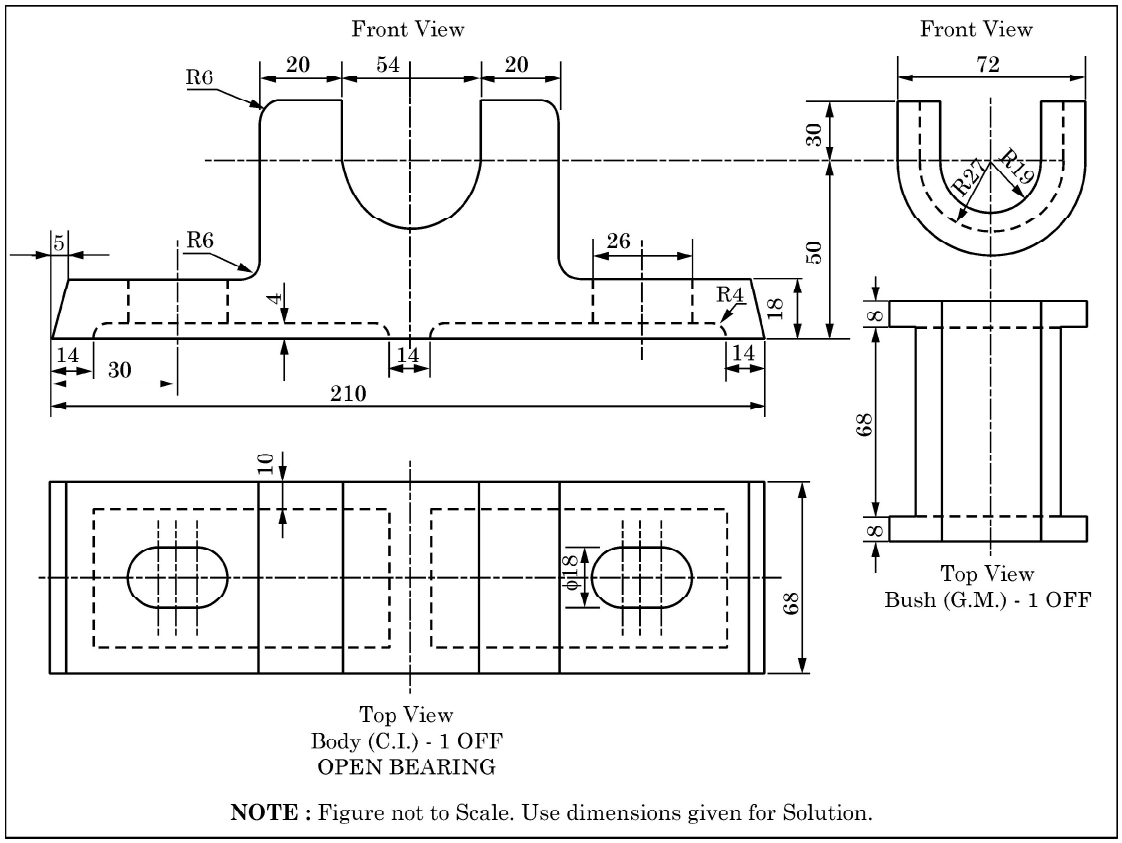


Fig. 1

OR

(B) Fig. 2 shows the assembly of a **Bush Bearing**. Disassemble the parts correctly and then draw to scale 1 : 1 its following views of the following components. Keep the same position of both body and bush with respect to H.P. and V.P.

(i) Body

(a) Full sectional front view **8**

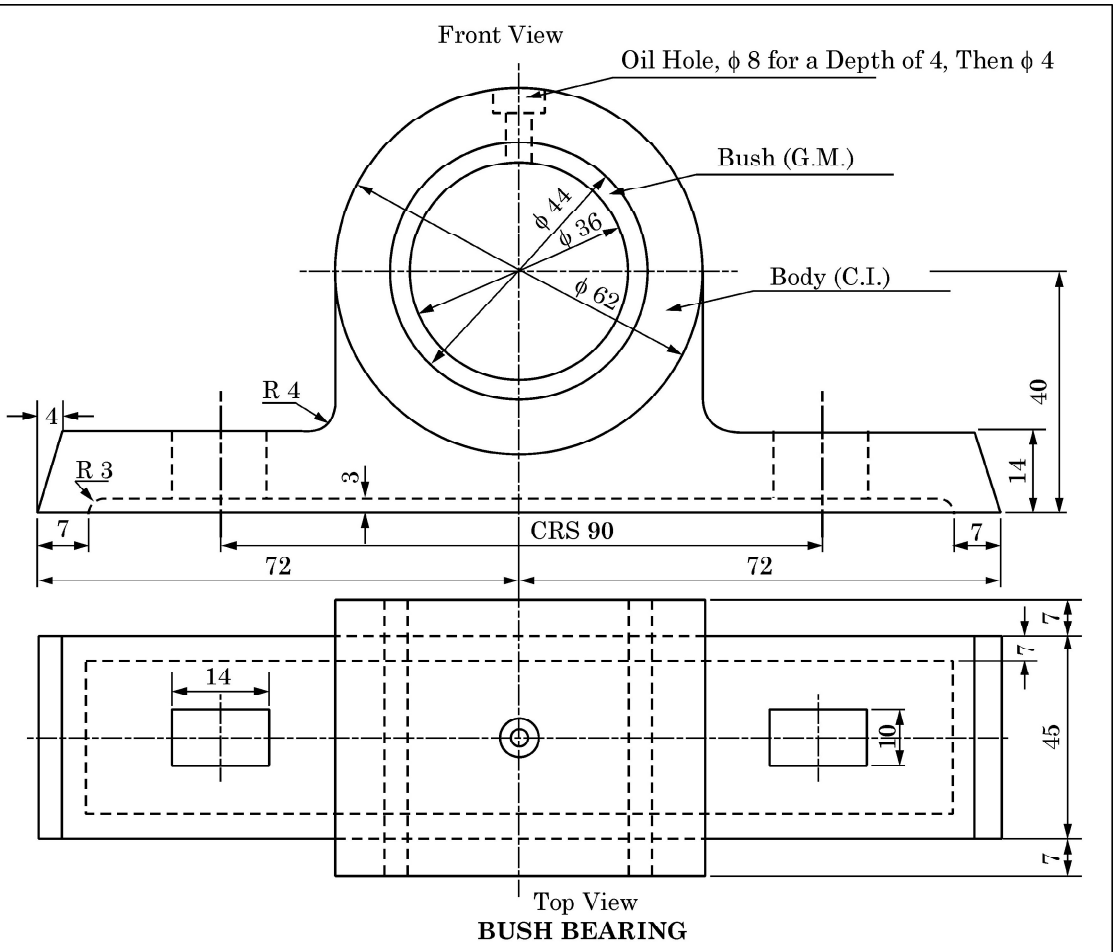
(b) Left side view **7**

(ii) बुश (Bush)

(a) सम्मुख दृश्य **3**

(b) पूर्ण अनुभागीय दायाँ पार्श्व दृश्य **3**

दोनों के शीर्षक तथा प्रयुक्त मापनी आलेखित कीजिए । प्रक्षेप चिह्न बनाइए । 6 महत्त्वपूर्ण विमाएँ दीजिए । **6**



चित्र-2

(ii) Bush

(a) Front view **3**

(b) Full sectional right side view **3**

Print the tittles of both and scale used. Draw the projection symbol. Give 6 important dimensions. **6**

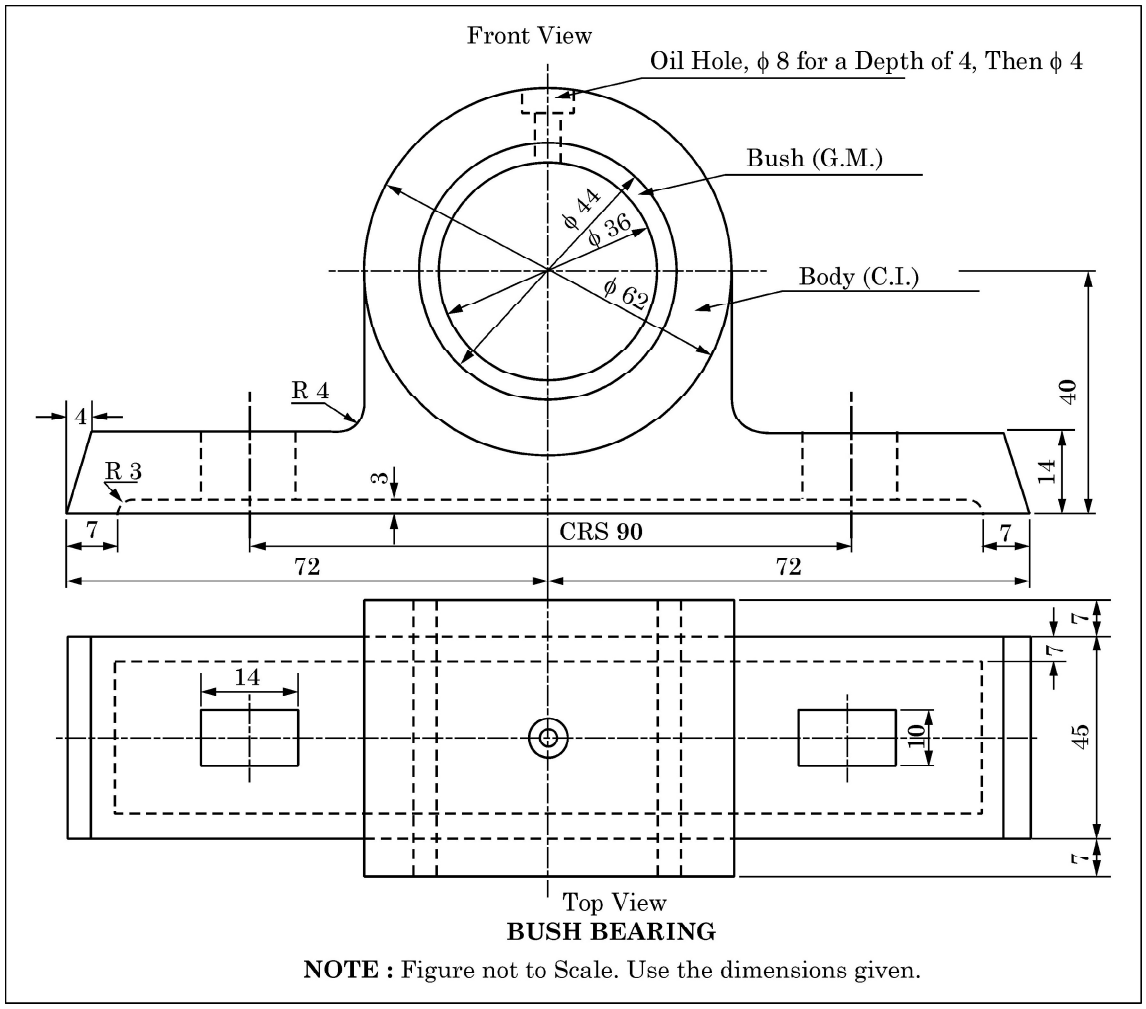


Fig. 2

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior School Certificate Examination, 2024
SUBJECT NAME ENGINEERING GRAPHICS (Q.P. CODE 68)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	**"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under various rules of the Board and IPC."**
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.**
4	The Marking scheme carries only suggested value points for the answers These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after delibration and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark(√) wherever answer is correct. For wrong answer CROSS 'X" be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.

10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 70 has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.
13	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- ● Leaving answer or part thereof unassessed in an answer book. ● Giving more marks for an answer than assigned to it. ● Wrong totaling of marks awarded on an answer. ● Wrong transfer of marks from the inside pages of the answer book to the title page. ● Wrong question wise totaling on the title page. ● Wrong totaling of marks of the two columns on the title page. ● Wrong grand total. ● Marks in words and figures not tallying/not same. ● Wrong transfer of marks from the answer book to online award list. ● Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) ● Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for Spot Evaluation**" before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

General Note:	
a)	Marks are to be awarded in proportion to the work done.
b)	Mistakes in dimensioning up to ± 1.0 mm may be ignored.
c)	In dimensioning, arrow-heads of various types, as per SP: 46-2003 codes are acceptable. However, where space is too small for an arrowhead, oblique stroke or dot may be employed.
d)	In question no. 21 and in sectioned view of question no. 23, if hidden edges / lines are drawn, no marks should be deducted.
e)	Other standard methods of drawing / proportions for isometric scale, nuts, heads of bolts, screws etc. employed by examinees, may also be accepted.
f)	The answers/solutions must be evaluated adhering to marking scheme and no marks should be deducted without mistake.

Set 4

MARKING SCHEME
ENGINEERING GRAPHICS

SECTION – A *20x1=20*

1. (B) axonometric, oblique and perspective

2. (B) Isometric projection

3. (B) behind V.P. and above H.P.

4. (B) Actual scale

OR

(D) Isometric scale

5. (B) (ii) and (iv) only

6. (C) (ii) and (iii) only

7. (C) (iii)

8. (D) 1-(i), 2-(iii), 3-(iv), 4-(ii)

9. (C) (iv) only

10. (A) 1-(iv), 2-(iii), 3-(i), 4-(ii)

11. (D) 1-(ii), 2-(i), 3-(iv), 4-(iii)

12. (A) 8 mm

13. (A) internally

14. (D) one

15. (B) arcs, circle

16. (C) major diameter circle as a complete circle and minor diameter as an incomplete circle.

17. (C) Stud

18. (A) 12 mm

19. (D) plain stud

20. (B) 20 mm

SECTION – B

21. (A) **CONSTRUCTION OF ISOMETRIC SCALE** ` ***5***

(i) Drawing lines at an angle of 30° and 45° *1*

(ii) Marking of divisions of 10 mm, including division of first part of 1 mm on true length/scale 1:1 *1*

(iii) Projections from scale 1 : 1 to get points on isometric scale, construction of isometric scale *2*

(iv) Printing "True Length/Scale 1:1", "Isometric Length/Isometric Scale" and marking angles 30^0, 45^0 *1*

(B) **ISOMETRIC PROJECTION OF PENTAGONAL PRISM** ***10***

(i) Drawing helping figure of pentagon *2*

(ii) Drawing upper isometric pentagon (2) and lower isometric pentagon (1) keeping one base edge parallel to V.P. and away from it. *3*

(iii) Drawing vertical edges *3*

(iv) Marking the axis (½) and direction of viewing (½) *1*

(v) Dimensions *1*

Note : For incorrect position, 1 mark should be deducted

22.(A)PROFILE OF KNUCKLE THREAD *8*

(i) Marking of horizontal distances equal to half of pitch and one horizontal centre line to create centre points of arcs *2*

(ii) Drawing semi-circular arcs of radius 0.25P, showing crests and roots of threads (minimum two) *3*

(iii) Drawing hatching lines with conventional break *1*

(iv) Standard dimensions *2*

OR

(B) SQUARE HEADED BOLT *8*

Front View

(i) Shank with threaded portion (length of bolt as 80mm) and conventional end, drawn correctly *2*

(ii) Head portion with chamfering, drawn correctly *2*

Left Side View

(i) Left side view with chamfering circle and conventional representation of threads, drawn correctly *2*

Standard dimensions *2*

Note :

1. For incorrect position or freehand sketch, 2 marks should be deducted, in all.

2. The position of head of the square headed bolt can be drawn on either side and must be projected accordingly in left side view.

23.(A) ASSEMBLY OF OPEN BEARING

(i) **Front view right half in section** ***13***

- Drawing the right half of the body (2), sole recess (1) and hatching lines (1) *4*

- Drawing the right half of the bush (2) with hatching lines (1) *3*

- Drawing left half of the body *2*

- Drawing collar of the bush in left half *2*

- Drawing the bolt hole in right half (1½) and axis of the bolt hole in the left half (½) 2

(ii) **Left side view** ***8***

- Drawing the boundary of the body with one horizontal line for sole at 18mm (2 ½) and hidden lines showing bolt hole and sole recess (1 ½) *4*

- Drawing the collar portion of bush on each side (2) with two hidden lines (2) *4*

DETAILS ***6***

Printing title (1), Scale used (1), Projection symbol (1), Six important dimensions (3)

OR

(B) BUSH BEARING (DISASSEMBLY)

(i) BODY

(a) **Full sectional front view** ***8***

- Drawing the outline of the body (2), drawing two bolt holes indicating CRS (2), recess (1) *5*

- Drawing inner circle of dia 44mm *1*

- Drawing of oil hole *1*

- Hatching lines *1*

(b) **Left side view** ***7***

- Drawing the outline of the body with one horizontal line for sole at 14mm 3

- Two horizontal hidden lines (1) and hidden lines showing bolt hole and recess (2), hidden oil hole (½) 3 ½

- Cutting plane ½

(ii) BUSH

(a) **Front view** ***3***

- Two circles *2*

- Hidden oil hole (½), cutting plane (½) *1*

(b) **Full sectional right side view** ***3***

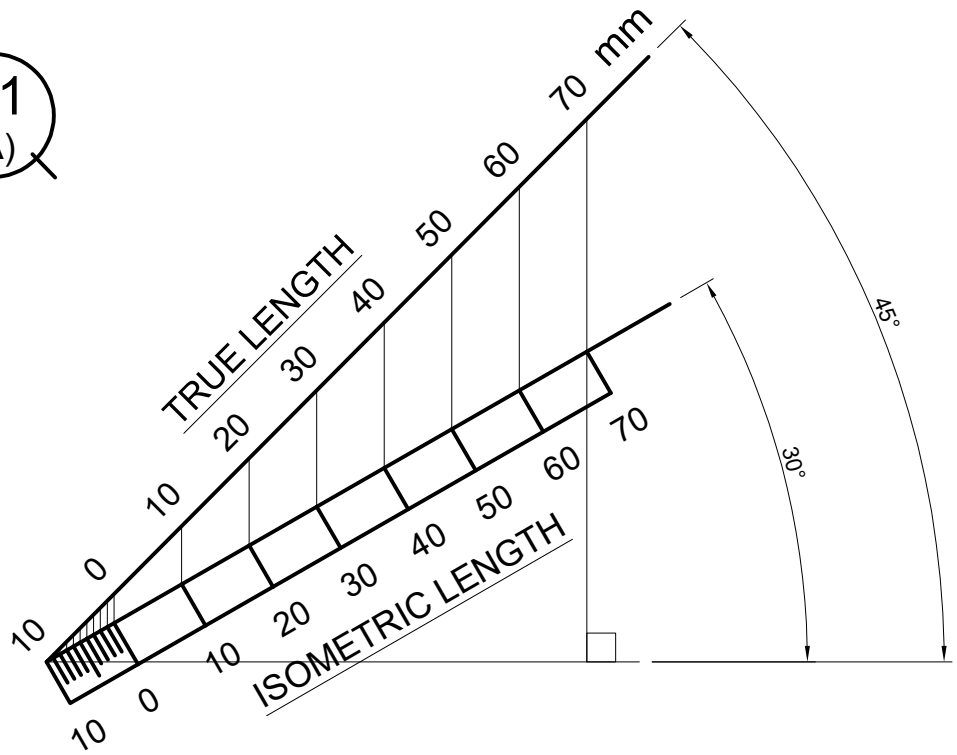
- Entire outline with two inner horizontal lines (2), oil hole (½) *2 ½*

- Hatching lines ½

DETAILS ***6***

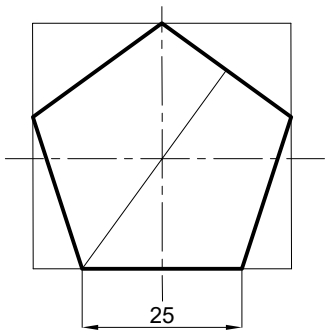
Printing titles (1), Scale used (1), Projection symbol (1), Six important dimensions (3)

21
(A)

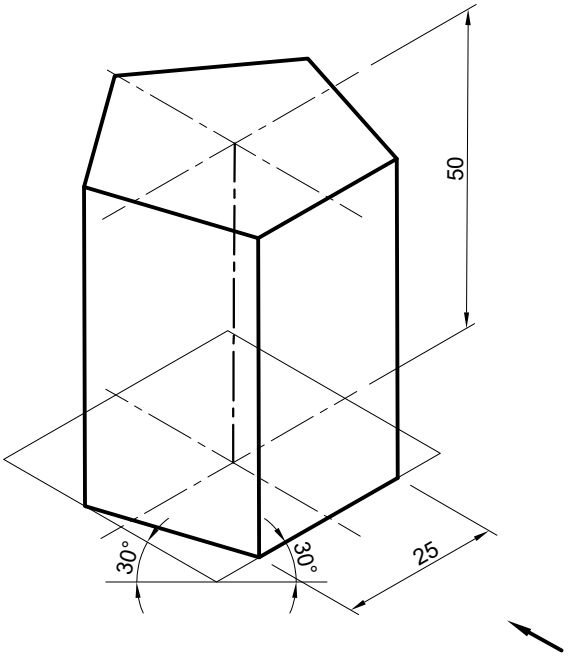


ISOMETRIC SCALE

21
(B)



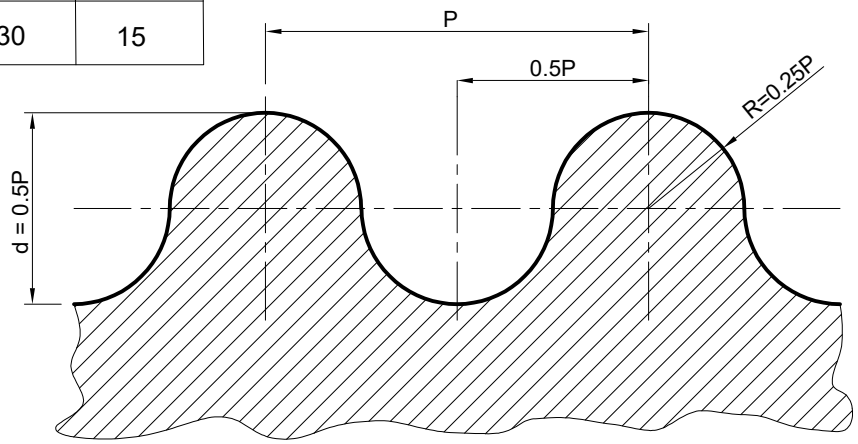
HELPING FIGURE



ISOMETRIC PROJECTION

22 (A)

P	d=0.5P	R=0.25P
60	30	15



KNUCKLE THREAD

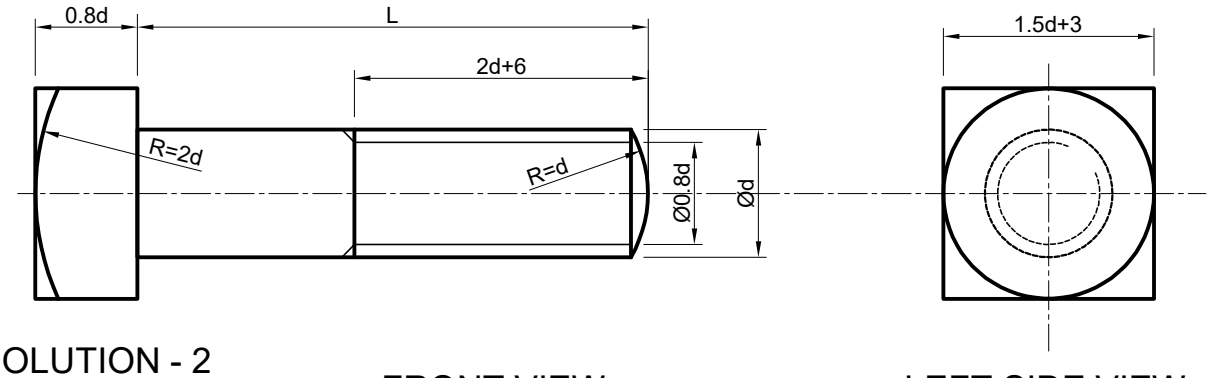
OR

22 (B)

SQUARE HEADED BOLT

d	0.8d	1.5d+3	2d	2d+6	L
20	16	33	40	46	80

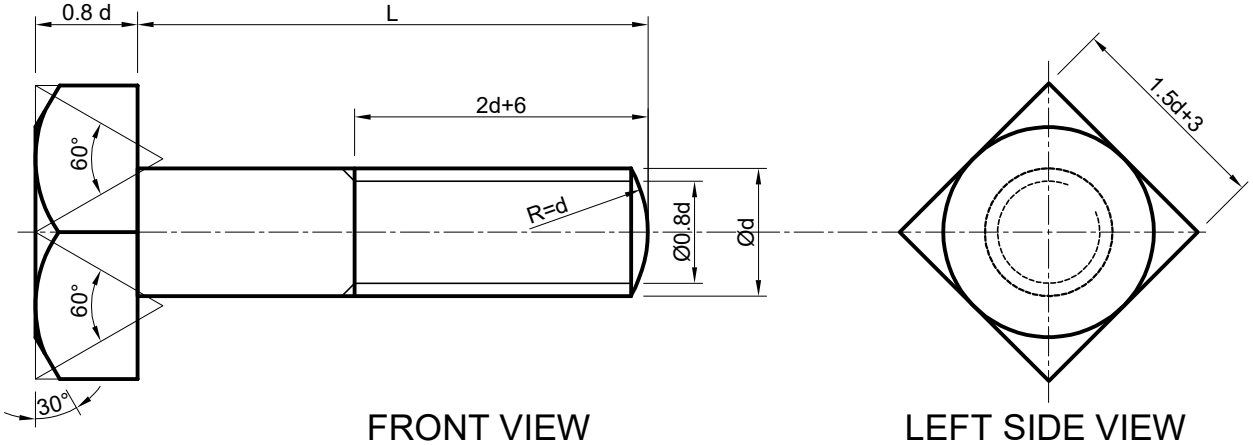
SOLUTION - 1



FRONT VIEW

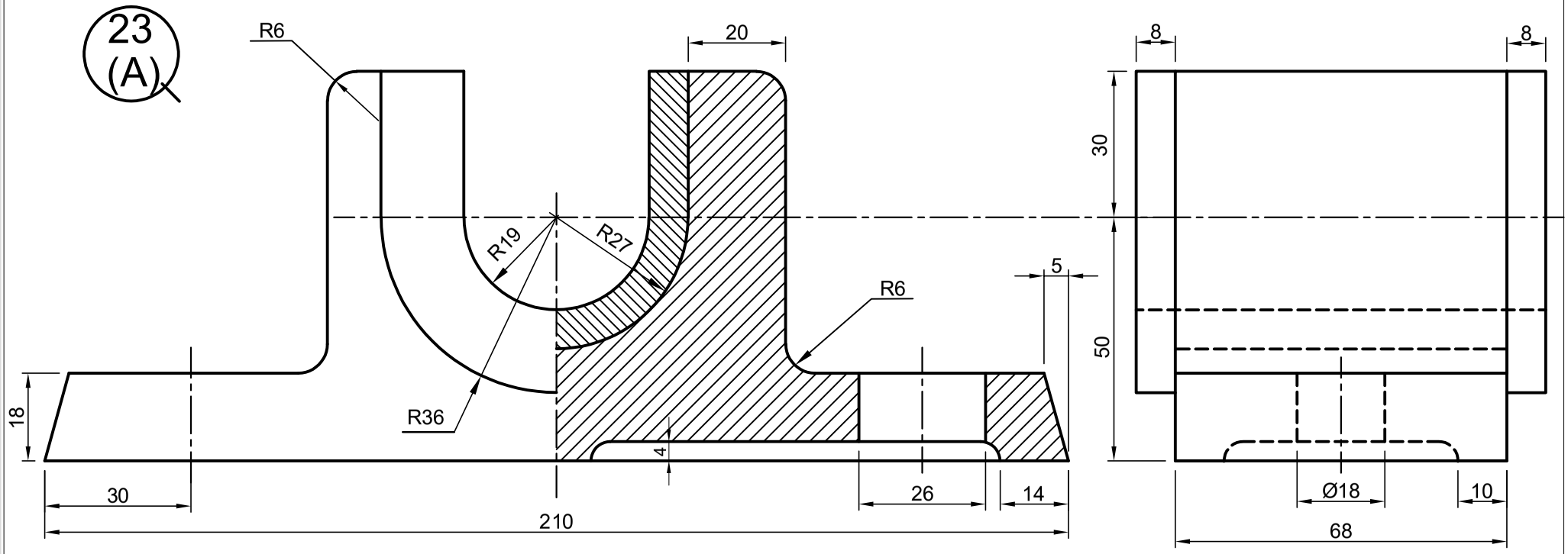
LEFT SIDE VIEW

SOLUTION - 2



FRONT VIEW

LEFT SIDE VIEW



FRONT VIEW, RIGHT HALF IN SECTION

LEFT SIDE VIEW

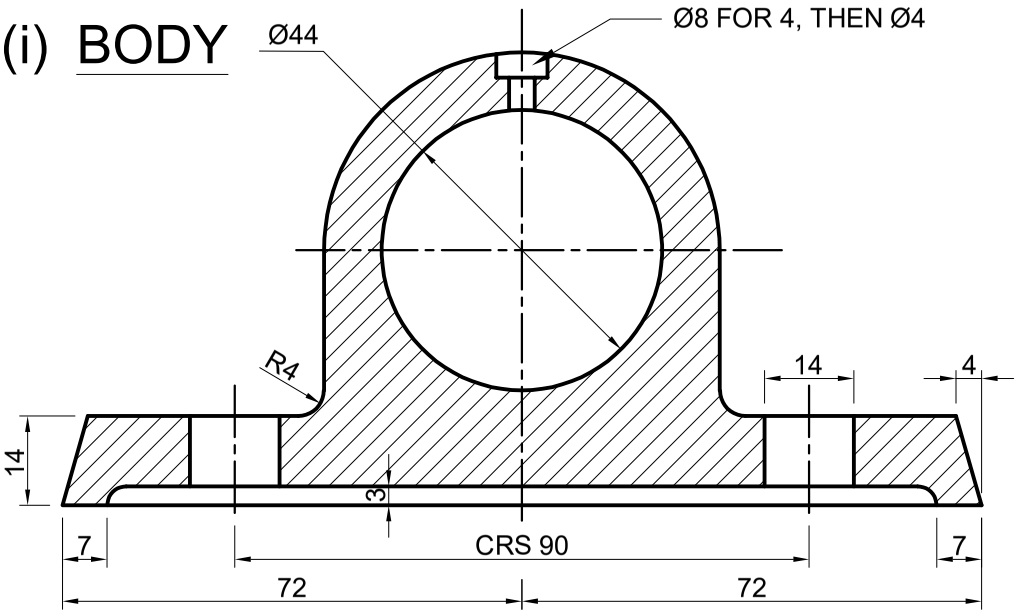
SCALE - 1:1

ASSEMBLY OF OPEN BEARING

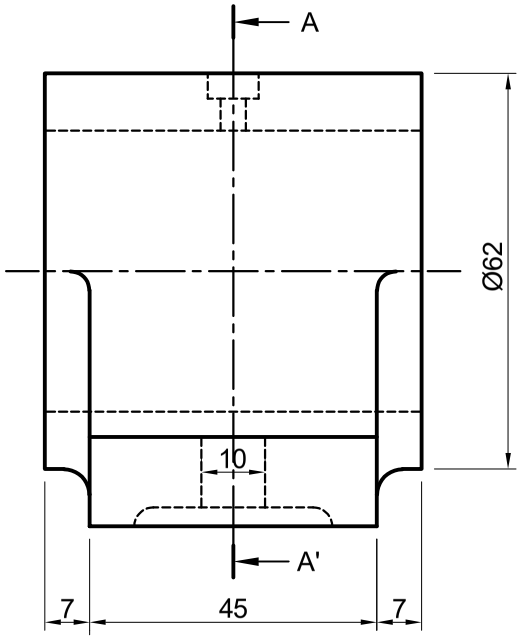
OR

23 (B)

(i) BODY

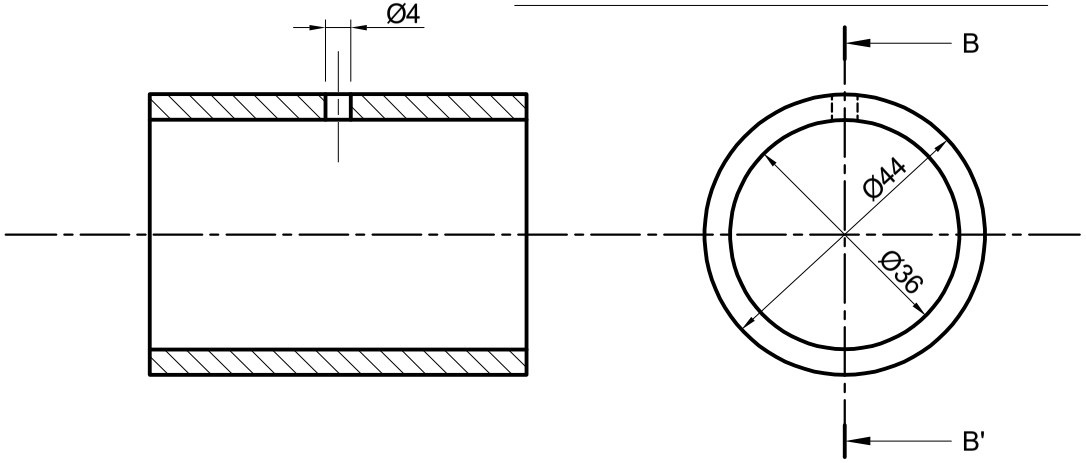


FULL SECTIONAL FRONT VIEW



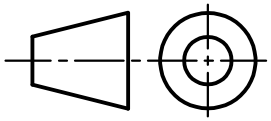
LEFT SIDE VIEW

(ii) BUSH



FULL SECTIONAL RIGHT SIDE VIEW

FRONT VIEW



SCALE 1:1

DISASSEMBLY OF BUSH BEARING