

B.Arch-I&II-05.17-0663

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## B.Arch. Degree I & II Semester Examination May 2017

### AR 1101 ARCHITECTURAL DESIGN I (2014 Scheme)

Time : 4 Hours

Maximum Marks : 100

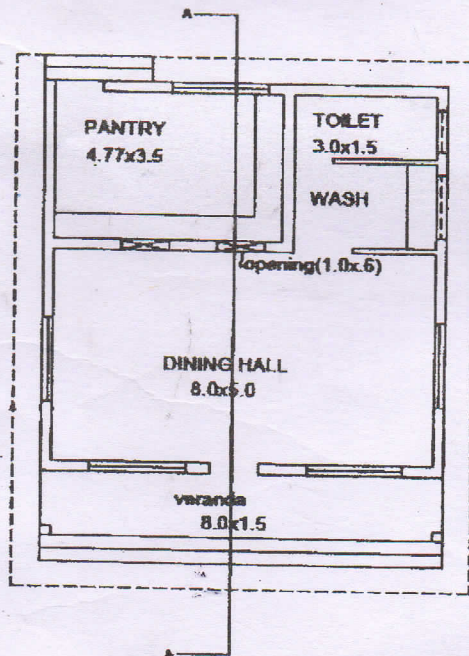
#### Instructions:

- One drawing sheet (A1 size) and two butter sheets must be supplied.
- The drawing should be properly dimensioned, labeled in good lettering and rendered appropriately.
- Importance will be given to drafting quality, correctness of drawing and conformity with drafting standard.

(1×100=100)

- I. Prepare a neatly drafted, detailed technical drawing of the building plan of a dining hall (seating 15 Nos.) given below in Scale 1:50. (100)

- Floor plan with plastering, door/window frames, and furniture layout.
- Front elevation.
- Section through the line A-A.



#### Design data

Plinth height from ground level - 0.45m  
Lintel height - 2.1 m, floor height- 3.0m  
Wall thickness 0.23 m, half wall-0.12m  
Sunshade projected at lintel level.  
Sizes of door and window may be assumed.

Any other necessary data may be assumed

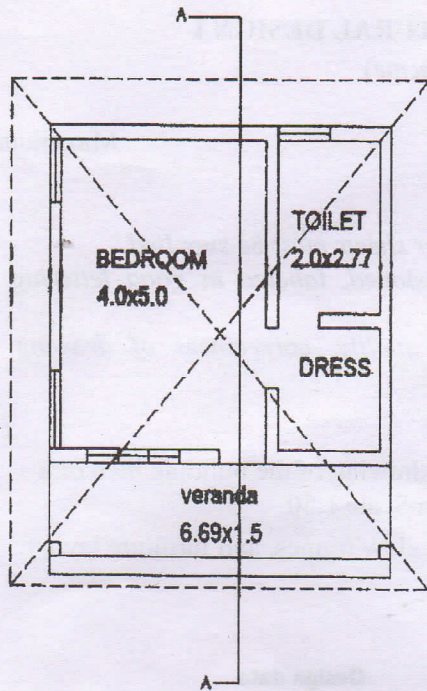
OR

(P.T.O.)



II. Prepare a neatly drafted, detailed technical drawing of the building plan of an independent guest room given below in Scale 1:50. (100)

- (a) Floor plan with plastering, door/window frames and furniture layout.
- (b) Front elevation.
- (c) Section through the line A-A.



#### Design data

Plinth height from ground level - 0.45m

Lintel height - 2.1 m, floor height- 3.0m

Wall thickness 0.23 m

Sizes of door and window may be assumed.

Pitched roof, minimum height of wall from plinth- 2.7m

Any other necessary data may be assumed

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## ***B.Arch. Degree I&II Semester Examination May 2017***

### **AR 1102 BUILDING MATERIALS AND CONSTRUCTION I (2014 Scheme)**

Time : 4 Hours

Maximum Marks : 100

*(One drawing sheet to be supplied. Illustrate all answers with sketches)*

#### **PART A**

(8 × 5 = 40)

- I. Write short notes on the following.
- (a) Classification of stone.
  - (b) Water-cement ratio.
  - (c) Concrete blocks.
  - (d) Damp proofing.
  - (e) Ashlar masonry.
  - (f) Seasoning of timber.
  - (g) Properties of bamboo.
  - (h) Rules to be observed in good bond.
- II. Discuss the advantage and disadvantage of brick and stone masonry. (10)
- OR**
- III. Explain workability of concrete. What are the factors affecting workability? (10)
- IV. What are the causes of decay in timber? Discuss the various defects in timber. (10)
- OR**
- V. Discuss the application of bamboo in construction industry. (10)

#### **PART B**

(2 × 20 = 40)

- VI. Draw to suitable scale the plan of alternate courses and elevation of brick walls meeting at corner with thickness of wall as 1½ bricks in English bond.
- OR**
- VII. Draw to suitable scale the plan of alternate courses and elevation of brick walls meeting at corner with thickness of wall as 1½ bricks in Flemish bond.
- VIII. Draw to scale the following.
- (i) Any two lengthening joint.
  - (ii) Any two widening joint.
- OR**
- IX. Illustrate the details of bamboo construction.



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## ***B.Arch. Degree I & II Semester Examination May 2017***

### **AR 1103 HISTORY OF ARCHITECTURE I (2014 Scheme)**

Time : 3 Hours

Maximum Marks : 100

*(Illustrate your answer with sketches wherever necessary)*

#### **PART A**

(Answer *ALL* questions)

(8 × 5 = 40)

- I. Write short notes on the following.
- (a) Archaeological site of Gobekli Tepe.
  - (b) Ziggurat.
  - (c) Doric order.
  - (d) Pantheon.
  - (e) Vedic railing.
  - (f) Chaitya hall.
  - (g) Rathas at Mahabalipuram.
  - (h) Nalukettu.

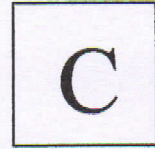
#### **PART B**

(4 × 15 = 60)

- II. Explain with neat sketches the gradual transformation of architectural forms of Egyptian tombs from Mastabas to Pyramids. (15)
- OR**
- III. Indus valley civilization marked an era in the history, well advanced to the time frame of its existence in terms of its city planning and architecture. Establish. (15)
- IV. Explain in detail the architectural characteristics of stupas, Chaitya halls and Viharas found in the Buddhist period of Indian architecture. (15)
- OR**
- V. Compare and contrast the Nagara style (north India) of architecture and the Dravidian style of architecture in South India. (15)
- VI. What are the factors influencing the architectural character of any place in evolving identity to a particular civilization? (15)
- OR**
- VII. 'The Jomon period lasted so long and is so culturally diverse', says the historians and archaeologists. Comment on the statement with respect to the different phases that existed in the Jomon period. (15)
- VIII. Kerala has always retained its identity since its origin and has evolved a vernacular tradition of architectural style with respect to the climate and the culture. Establish. (15)
- OR**
- IX. Explain in detail with sketches, the planning principles of traditional residential architecture of Kerala with reference to the planning of Padmanabhapuram palace. (15)



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***B.Arch. Degree I&II Semester Examination May 2017***

**AR 1105 ARCHITECTURAL GRAPHICS I  
(2014 Scheme)**

Time : 4 Hours

Maximum Marks : 100

*(Candidates will be supplied with A-2 size handmade drawing sheet.)*

(4 × 25 = 100)

- I. How was the progressive artist group established? Explain their contribution to Indian Modern Art.
- OR**
- II. Explain post impressionism and its after effects for the further development of CUBISM.
- III. Imagine a composition of four varied objects of different sizes one each of a cube, a sphere, a cylinder and a cone arranged together. Sketch out the effect of light and shadow when a stream of light is passed from the right side of the composition (use monochromatic colour scheme).
- OR**
- IV. Sketch the effects of light in two different angles on a composition made using any three texture and any five shapes and using any colour scheme.
- V. Design a colour poster in connection with "Clean India Campaign" to an approximate size of paper 20 cm x 30 cm.
- OR**
- VI. Sketch out the bird's eye view of a well planned city using pencil rendering.
- VII. What are the visual elements essential for a great composition? Give illustrative sketches to explain it.
- OR**
- VIII. Sketch two point perspective view of a traditional Kerala house. Render it with light and shade in pencil.

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## B.Arch. Degree I & II Semester Examination May 2017

### AR 1106 MATHEMATICS (2014 Scheme)

Time: 3 Hours

Maximum Marks: 100

#### PART A (Answer ALL questions)

(8 × 5 = 40)

- I. (a) Solve the exact equation  $(x^3 + 3xy^2)dx + (3x^2y + y^3)dy = 0$ .
- (b) Solve  $(D^2 + 2D + 1)y = \cos 2x + e^{2x}$ .
- (c) If  $u = \sin^{-1}\left(\frac{x^2 + y^2}{x + y}\right)$ . Prove that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \tan u$ .
- (d) If  $u = \sqrt{xy}$ ,  $v = \sqrt{\frac{x}{y}}$ , Prove that  $JJ^* = 1$ .
- (e) Out of 800 families of 5 children each, how many would you expect to have  
(i) 3 boys and (ii) 5 girls.
- (f) If  $x$  is a normal variable with mean 30 and S.D 5. Find:  
(i)  $p(26 \leq x \leq 40)$  (ii)  $p(x \geq 45)$ .
- (g) The mean operating life of a random sample of 10 light bulbs is 4000 hours with a S.D 200hours. Estimate a 95% confidence interval for the population mean.
- (h) Define the following terms.  
(i) Type I error (ii) Type II error (iii) Power of a test.

#### PART B

(4 × 15 = 60)

- II. (a) Solve  $(D^2 - 5D + 6)y = e^x \cos 2x$ . (7)
- (b) Solve  $\frac{dx}{dt} - y = t$ ,  $\frac{dy}{dt} + x = t$ , given  $x(0) = 1$  and  $y(0) = 2$ . (8)
- OR
- III. (a) Solve  $x \frac{dy}{dx} + xy = xy^{-2}$ . (7)
- (b) Solve  $x^2 \frac{d^2y}{dx^2} + 4x \frac{dy}{dx} + 2y = e^x$ . (8)
- IV. (a) If  $u$  is a homogeneous function of degree  $n$  in  $x$  and  $y$ . Show that (7)  
$$x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = n(n-1)u$$
- (b) Show that of all rectangular parallelepipeds with given volume, the cube has the least surface area. (8)

OR

(P.T.O.)



- V. (a) The oscillation period of a pendulum is  $T = 2\pi\sqrt{\frac{l}{g}}$ , where 'l' is the length of the pendulum and 'g' is the acceleration gravity. What percentage error will be made in determining T, if we take  $\pi = 3.14$  (accurate to 0.005),  $l = 1\text{m}$  (accurate to 0.01m),  $g = 9.8\text{m/s}^2$  (accurate to  $0.02\text{m/s}^2$ )? (7)

- (b) If  $u = \log(x^3 + y^3 + z^3 - 3xyz)$ , prove that (8)

$$\left(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z}\right)^2 u = \frac{-9}{(x+y+z)^2}.$$

- VI. (a) By the method of least squares find the best fitting straight line to the following data. (7)

x:	5	10	15	20	25
y:	15	19	23	26	30

- (b) Fit a Poisson distribution to the following data. (8)

x:	0	1	2	3	4
f:	122	60	15	2	1

OR

- VII. (a) Obtain the rank correlation for the data (7)

x:	68	64	75	50	64	80	75	40	55	64
y:	62	58	68	45	81	60	68	48	50	70

- (b) From the following data obtain the two regression equations. (8)

x:	6	2	10	4	8
y:	9	11	5	8	7

- VIII. (a) The average numbers of articles produced by two machines per day are 200 and 250 with SD 20 and 25 respectively on the basis of 25 days production. (7)

Can you regard both the machines equally efficient at 1% level of significance?

- (b) Given the following information relating to two places A and B, test whether there is any significant difference between their mean wages. (8)

	A	B
Mean wages (₹):	47	49
S.D:	28	40
Number of workers:	1000	1500

OR

- IX. (a) A certain stimulus administered to each 12 patients resulted in the following changes in blood pressure 5, 2, 8, -1, 3, 0, -2, 1, 5, 0, 4, 6. Can it be concluded that the stimulus will in general be accompanied by an increase in blood pressure? (7)

- (b) The average number of articles produced by two machines per day are 200 and 250 with S.D 20 and 25 respectively on the basis of 25 days production. Can you regard both machines equally efficient at 1% level of significance? (8)

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## B.Arch. Degree I & II Semester Examination May 2017

### AR 1107 GEOMETRICAL DRAWING (2014 Scheme)

Time : 4 Hours

Maximum Marks : 100

*Instructions:*

- (1) Answer **Part A** in the answer book provided.
- (2) Answer **Part B** in the drawing sheet provided.
- (3) Assure suitable scale/data wherever necessary.

#### PART A

(Answer **ALL** questions)

(8 × 5 = 40)

- I.
  - (a) Explain RF with example.
  - (b) In the case of conics define:
    - (i) Double ordinate.
    - (ii) Latus rectum.
    - (iii) Chord.
    - (iv) Focal chord.
  - (c) Draw the orthographic projection of points.
    - (i) Point A, 20mm above HP and 30mm in front of VP.
    - (ii) Point B, 20mm above HP and 30 mm behind VP.
  - (d) Differentiate between true section and apparent section.
  - (e) Briefly describe the method of determining line/curve intersection.
  - (f) Explain core method of drawing development of sphere.
  - (g) Differentiate between isometric view and isometric projection.
  - (h) Type of perspective projections.

#### PART B

(4 × 15 = 60)

- II. Draw the logarithmic spiral for one convolution, the successive radii are of ratio 9:8. Final radius vector is 90 mm and the angle between successive radii being 30°. Assume the curve is anticlockwise.
- OR**
- III. Construct an ellipse having major and minor axis in the ratio 3:2. Major axis is 135 mm. Draw the ellipse using concentric circle method.
  - IV. A line measuring 90 mm has its end A 20 mm in front of VP and 30 mm above HP and other end B is 50mm in front of VP and 40 mm above HP. Draw the projection of the line and find the inclination of the lines with both reference planes of projection.

**OR**

(P.T.O.)



V. A square prism, base 30 mm and axis 75 mm, has its axis inclined at  $50^\circ$  to the ground. It has an edge of base parallel to the ground and inclined at  $40^\circ$  to VP. Draw the projection of the prism.

VI. A cone of base diameter 60 mm and height 80 mm rest on the ground on its base. It is cut by a section plane inclined to the VP at  $10^\circ$  and passes through the point 10 mm from the top of vertex. Draw sectional top view, front view and true shape of the section.

OR

VII. A Pentagonal pyramid, side of base 45 mm and axis length 85 mm is resting on its base on HP, with one base edge  $40^\circ$  inclined to VP. It is cut by a section plane perpendicular to VP, inclined  $30^\circ$  to HP and passing through the middle of the axis. Draw development of the bottom portion of the pyramid.

VIII. Draw the isometric view of a pentagonal pyramid, side of base 40 mm and height 80 mm which rests with base centrally on a cylinder of diameter 120 mm and height 40 mm.

OR

IX. Draw the prospective projection of a pentagonal prism of side 25 mm and length 50 mm, lying on one of its rectangular faces on the ground plane and one pentagonal face touching the picture plane. The station point is 55 mm in front of the picture plane and lies in the central plane which is 75 mm to the left of the centre of prism. Station point is 30 mm above the ground plane.

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## B.Arch. Degree I & II Semester Examination May 2017

### AR 1108 MECHANICS OF STRUCTURES (2014 Scheme)

Time: 3 Hours

Maximum Marks: 100

#### PART A (Answer ALL questions)

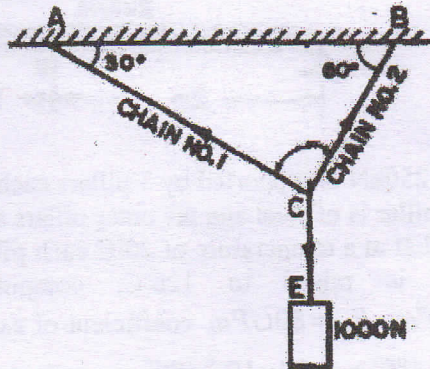
(5 × 8 = 40)

- I. (a) Explain with the help of a neat diagram what free body diagram is.  
 (b) What are the assumptions in the analysis of trusses?  
 (c) State the laws of dry friction.  
 (d) Explain parallel and perpendicular axis theorems.  
 (e) Define the terms shear force and bending moment.  
 (f) What is point of contraflexure? Illustrate with example.  
 (g) Define (i) Poisson's ratio (ii) Bulk modulus.  
 (h) What are the assumptions in simple bending theory?

#### PART B

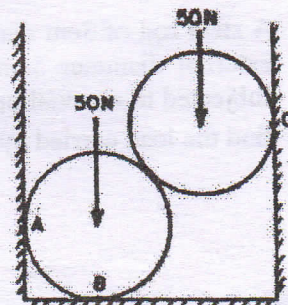
(4 × 15 = 60)

- II. A weight of 1000N is supported by two chains as shown in figure. Determine the tension in each chain.



OR

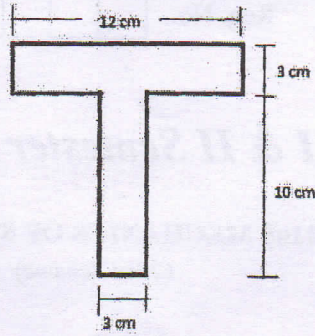
- III. Two spheres, each of weight 50N and of radius 10cm rest in a horizontal channel of width 36cm as shown in figure. Find the reactions on the points of contact A, B and C.



(P.T.O.)

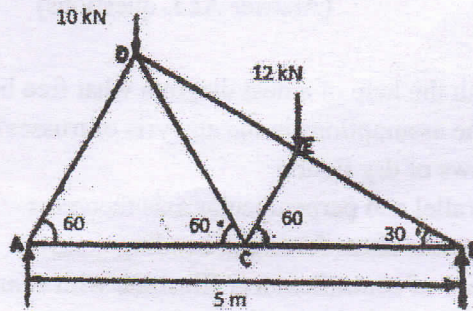


- IV. Determine the moment of inertia of the T section about the centroidal axis.



OR

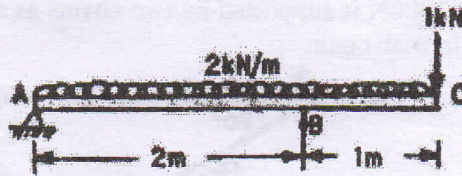
- V. A truss of span 5 m is loaded as shown in figure. Find the forces in the members of the truss.



- VI. Draw the SFD and BMD of the simply supported beam of span 12 m carrying UDL of 10 kN/m from the left end for half the span.

OR

- VII. Draw the SFD and BMD of the overhanging beam loaded as shown in figure.



- VIII. A weight of 250 kN is supported by 3 pillars each of  $600 \text{ mm}^2$  in cross section. The central pillar is of steel and the outer pillars are of copper. The pillars are so adjusted that at a temperature of  $20^\circ\text{C}$  each pillar carries equal load. If the temperature is raised to  $120^\circ\text{C}$ , compute the stresses induced.  $E_S = 200 \text{ GPa}$ ,  $E_C = 80 \text{ GPa}$ , coefficient of expansion for steel and copper are  $12 \times 10^{-6} / ^\circ\text{C}$  and  $18 \times 10^{-6} / ^\circ\text{C}$  respectively.

OR

- IX. A steel rod of 3 cm diameter is enclosed centrally in a hollow copper tube of external diameter 5 cm and internal diameter 4 cm. The composite bar is subjected to an axial pull of 4500 N. If the length of the bar is equal to 10 cm, find the load carried by each bar.  $E_S = 200 \text{ GPa}$ ,  $E_C = 80 \text{ GPa}$ .

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## **B. Arch. Degree I & II Semester Examination May 2017**

### **AR 1109 SURVEYING AND LEVELLING (2014 Scheme)**

Time: 3 Hours

Maximum Marks: 100

#### **PART A (Answer ALL questions)**

(8 × 5 = 40)

- I. (a) What is base line, tie line and offset?  
 (b) What is the orientation of plane table surveying?  
 (c) Write a short note on booking the field notes.  
 (d) What is GPS? Explain its uses.  
 (e) What is reciprocal leveling?  
 (f) Differentiate digital and auto levels.  
 (g) Explain the fundamental lines of a transit theodolite.  
 (h) What are the characteristics of contour?

#### **PART B**

(4 × 15 = 60)

- II. (a) What is ranging? Explain methods of ranging. (10)  
 (b) What are the errors of chaining? (5)
- OR**
- III. (a) Explain the method of solution of a two point problem by plane table survey. (10)  
 (b) What are the advantages and disadvantages of plane table survey? (5)
- IV. (a) Explain the method of measuring a horizontal angle by repetition method using a theodolite. (10)  
 (b) Explain the essential parts of a transit theodolite, with a neat sketch. (5)
- OR**
- V. (a) How will you find the vertical angle using a theodolite? (10)  
 (b) What is face right and face left observations? (5)
- VI. (a) What is the working principle of total station? What are the advantages of total station? (10)  
 (b) What is the use of a distomat? (5)
- OR**
- VII. (a) What are the applications of GPS? (10)  
 (b) How is map prepared from arial photography? (5)
- VIII. The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eighth readings 2.225, 1.505, 0.989, 2.015, 2.864, 1.265, 0.605, 1.982, 1.044 and 2.864 m. Enter the readings in a page of a level book and calculate the R.L of points, if the first reading was taken with a staff held on a bench mark of 425.255 m. (15)
- OR**
- IX. Describe various methods of contouring with neat sketches. (15)