

AQ 1011728

JD 2014

GENERAL ENGINEERING / सामान्य इंजीनियरी
PAPER II / प्रश्न-पत्र II

Time allowed : 2 Hours

Maximum Marks : 300

निर्धारित समय : दो घण्टे

अधिकतम अंक : 300

Attention :

1. Paper consists of **Part A (Civil and Structural)** and **Part B (Electrical)** and **Part C (Mechanical)** and only one Part is to be attempted as per option given in the Application Form. Candidates should attempt **5 questions in all**. All questions carry **equal marks**.
2. Each candidate will be **given one Answer Book**.
3. Answers to all questions must be written in one language, i.e., either in English or in Hindi according to the option given by the candidate in his/her Application Form. Candidates are not allowed to write the answers partly in English and partly in Hindi.
4. Candidates must write their Name, Roll No., Ticket No., Name of the Examination and Subject at the prescribed place on the cover page of the Answer Book correctly. Candidates must also put their signature, and left-hand thumb impression on the cover page at the prescribed place. The above instructions must be fully complied with failing which the Answer Book will not be evaluated and zero mark will be awarded.
5. No credit will be given for answers written in a language other than the one opted by the candidate.
6. Necessary tables of IS 456 : 2000 Code of Practice are given at the end of Part A for use of candidates attempting Civil and Structural part.
7. "Mobile phones and wireless communication devices are completely banned in the examination halls/rooms. Candidates are advised not to keep mobile phones/any other wireless communication devices with them, even switching it off, in their own interest. Failing to comply with this provision will be considered as using unfair means in the examination and action will be taken against them including cancellation of their candidature."

ध्यान दीजिए:

1. प्रश्न-पत्र में भाग क (सिविल एवं संरचनात्मक) और भाग ख (विद्युत) एवं भाग ग (यांत्रिक) और आवेदन-पत्र में दिए गए विकल्प के अनुसार केवल एक भाग का ही उत्तर दिया जाना है। अभ्यर्थियों को कुल पाँच प्रश्नों का उत्तर देना है। सभी प्रश्नों के अंक बराबर हैं।
2. प्रत्येक अभ्यर्थी को केवल एक उत्तर-पुस्तिका दी जाएगी।
3. सभी प्रश्नों के उत्तर अभ्यर्थी द्वारा अपने आवेदन-पत्र में दिए गए विकल्प के अनुसार किसी एक भाषा में अर्थात् अंग्रेजी या हिन्दी में, दिए जाने चाहिए। अभ्यर्थियों को कुछ उत्तर अंग्रेजी में और कुछ उत्तर हिन्दी में लिखने की अनुमति नहीं है।
4. अभ्यर्थी उत्तर-पुस्तिका के आवरण पृष्ठ पर निर्धारित स्थान में अपना नाम, रोल नंबर, टिकट नंबर, परीक्षा का नाम तथा विषय सही-सही अवश्य लिखें। अभ्यर्थी आवरण पृष्ठ पर निर्धारित स्थान में अपने हस्ताक्षर एवं बाएँ हाथ के अँगूठे का निशान भी अवश्य लगाएँ। उपर्युक्त अनुदेशों का पूरी तरह अनुपालन किया जाए, अन्यथा उत्तर-पुस्तिका को नहीं जाँचा जाएगा और शून्य अंक दे दिया जाएगा।
5. अभ्यर्थी द्वारा दिए गए विकल्प की भाषा के अतिरिक्त किसी अन्य भाषा में दिए गए उत्तरों के लिए कोई अंक नहीं दिए जाएँगे।
6. सिविल एवं संरचनात्मक भाग की परीक्षा देने वाले अभ्यर्थियों के प्रयोग के लिए आई.एस. 456 : 2000 प्रेक्टिस कोड की आवश्यक सारणियाँ भाग क के अन्त में दी गई हैं।
7. "परीक्षा हॉलों/कमरों में मोबाइल फोन तथा बेतार संचार साधन पूरी तरह निषिद्ध है। प्रत्याशियों को उनके अपने हित में सलाह दी जाती है कि मोबाइल फोन/किसी अन्य बेतार संचार साधन को स्विच ऑफ करके भी अपने पास न रखें। इस प्रावधान का अनुपालन न करने को परीक्षा में अनुचित उपायों का प्रयोग माना जाएगा और उनके विरुद्ध कार्रवाई की जाएगी, उनकी अभ्यर्थिता रद्द कर देने सहित।"

JD 2014

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P.T.O.

PART A
General Engineering
(CIVIL AND STRUCTURAL)

- ✓ 1. (a) What are the constituents of good brick-earth ? What constituents render brick-earth unsuitable for manufacturing bricks ? 10
- (b) Describe any two tests to be performed in case of burnt clay bricks. 10
- (c) State the conditions under which you will recommend the following cements. Give also the reasons. 10
- (i) Rapid hardening cement
- (ii) High Alumina cement
- (d) Briefly explain 10
- (i) Assessed value
- (ii) Sinking fund
- (e) Determine the number of bags of cement required for a standard brick masonry for a wall of thickness 30 cm for a height of 10 m and length 200 m in 1 : 4 mortar. 20
- ✓ 2. (a) The readings given in the Table below were recorded in a levelling operation from points 1 to 10. Reduce the levels by the height of instrument method and apply appropriate checks. The point 10 is a bench mark having elevation of 66.374 m. Determine the loop closure. 30

Station	Chainage (m)	B.S.	I.S.	F.S.	Remarks
1	0	0.597			B.M. = 68.233 m
2	20	2.587		3.132	C.P
3	40		1.565		
4	60		1.911		
5	80		0.376		
6	100	2.244		1.522	C.P
7	120		3.771		
8	140	1.334		1.985	C.P
9	160		0.601		
10	180			2.002	

- (b) A soil sample in its natural state has, when fully saturated, a water content of 32.5%. Determine the void ratio, dry and total unit weights. Calculate the total weight of water required to saturate a soil mass of volume 10 m^3 . Assume $G_s = 2.69$. 15
- (c) Describe the method of laying Water Bound Macadam (WBM) road. 15
3. (a) Find the discharge through a rectangular orifice 2.0 m wide and 1.5 m deep fitted to a water tank. The water level in the tank is 3.0 m above the top edge of the orifice. Take $c_d = 0.62$. 30
- (b) Enumerate the assumptions made in Lacy's theory of canal designs. 15
- (c) Write short note on types of impurities in water in the light of domestic supply. 15
4. (a) Draw the shear force and bending moment diagram and label the values of the largest positive and negative shearing forces and bending moments for the beams with overhang as shown in Figure 1. 30

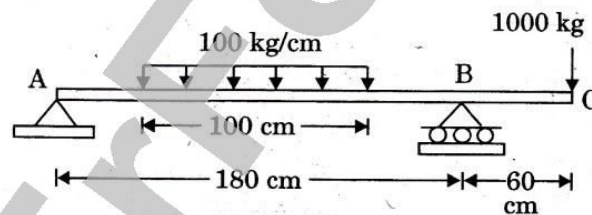


Figure 1

- (b) Describe the various defects in concrete along with precautions that should be exercised to prevent them. 30
5. (a) Describe briefly creep and shrinkage. 20
- (b) A rectangular, singly reinforced beam 300 mm wide and 500 mm effective depth is used as a simply supported beam over an effective span of 6 m. The reinforcement consists of 4 bars of 20 mm dia. If the beam carries a load of 12 kN/m (inclusive of self weight), determine the stress developed in concrete and steel. Take $m = 19$. 40
6. (a) Classify welded joints according to type of joints. 20
- (b) A single rivet lap joint is used to connect 12 mm thick plates by providing 20 mm dia rivets at 50 mm pitch. Determine the strength of the joint and joint efficiency. Take working stress in shear in rivets = 80 N/mm^2 , working stress in bearing in rivets = 250 N/mm^2 and working stress in axial tension in plates = 156 N/mm^2 . 40