BLACK DIAMOND SCHOOL OF ENGINEERING

CIVIL ENGINEERING DEPARTMENT

QUESTION BANK

4TH SEMESTER

SUB: STRUCTURAL DESIGN

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Sub - Structural Design-I 4th sem civil

Answer all Questions.

(1)
(a) Define characteristic strength of material ?   [2×10

(b) What is the advantage of a T-Beam ?

(c) Calculate x_{umax}/d value for Fe500 steel and M_{20} concrete?

(d) How can you know, if N.A of a T-beam lies within flange depth or in the web ?

(e) How can you know, whether the given column will be designed as a short column or long column ?

(f) Why is steel used as reinforcement ?

(g) Define depth of N.A. ?

(h) Mention the values of partial safety factors for concrete and steel.

(i) What do you mean by M_{20} mix ?

(j) What is the pH value of water which used of cement concrete ?

(2) Answer any five ?   [5×6
(a) An R.C.C. beam 250 mm wide × 520 mm effective depth is reinforced with 3 no.16 mm diameter bars in tension. Find out the depth of neutral axis and state the type of beam. The materials are M_{20} grade concrete and HYSD reinforcement of grade Fe415.
(NSM)

(b) Write (a) brief classification of columns ?

(c) Differentiate between WSM and LSM ?

(d) What are the assumptions made in limit state of collapse (flexure) ?

(e) Find out the design constants of a rectangular

section by taking M₂₀ grade of concrete and Fe415 grade of steel ?

(P) Give the I.S specifications for the effective span for simple supported beam. 2

Q)③ A tee beam of effective flange width 1200 mm, thickness of slab 100mm, width of rib 300mm and effective depth of 560 mm is reinforced with 4 no 25mm diameter bars. Calculate the factored moment of resistance of grade Fe415. 2

Q)④ Design a simply supported roof slab for a room 7.5 m × 3.5 m clear in size. The slab carrying an imposed load of 5 kn/m². Use M₂₀ and Fe415 steel 2.

Q)⑤ Find the factored moment of resistance of a beam section 230 mm wide × 460 mm effective depth reinforced with 2-16 mm diameter bars as compression reinforcement at an effective cover of 40 mm and 4-20 mm diameter bars as tension reinforcement. The materials are M₂₀ grade concrete and mild steel reinforcement 2