SUBJECT: PE7009 ADVANCED WELDING TECHNOLOGY

TIME: 3:00 HOURS   FULL MARKS: 60

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

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Q.1(a)	Why welding is advantageous than mechanical fastening and adhesive bonding?	[2]
Q.1(b)	Illustrate the process mechanics of explosive welding.	[4]
Q.1(c)	How do you produce a line weld using ultrasonic welding process? Explain with neat sketch.	[6]
Q.2(a)	Why a vacuum medium is used in electron beam welding setup?	[2]
Q.2(b)	How can the heat diffusion within target material be controlled by using different process parameters of electron beam welding?	[4]
Q.2(c)	Explain conduction mode and keyhole mode laser welding by citing suitable examples.	[6]
Q.3(a)	How hydrogen embrittlement and rapid quenching of metal structure during wet underwater welding process affect the weld quality?	[2]
Q.3(b)	Why is welding more difficult underwater than ordinary atmospheric conditions?	[4]
Q.3(c)	What are the different techniques of underwater welding? Explain them in brief.	[6]
Q.4(a)	Why it is that residual stress tends to become less of a problem the faster you complete a weld joint?	[2]
Q.4(b)	What are the causes of weld distortion? Discuss in brief.	[4]
Q.4(c)	How strain gauges are used to measure residual stresses in hole-drilling technique and ring-core technique?	[6]
Q.5(a)	"Weldability of metal is not an intrinsic property" – justify the comment.	[2]
Q.5(b)	Discuss the factors affecting weldability.	[4]
Q.5(c)	Compare the weldability of austenitic, ferritic, martensitic, and duplex stainless steels.	[6]
Q.6(a)	What does the welding symbols of Fig. 1 suggest to do? Explain with proper illustration.	[4]
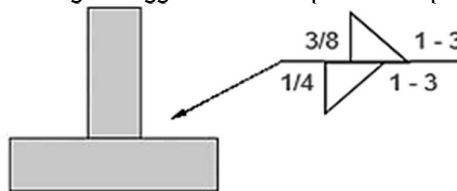
Fig. 1

Q.6(b) A steel plate, 150 mm wide and 12 mm thick, is joined with another steel plate by means of single   [8]
        transverse and double parallel fillet welds (Fig. 2). The strength of the welded joint should be equal to
        the strength of the plates to be joined. The permissible tensile and shear stresses for the weld material
        and the plates are 80 and 60 N/mm^2, respectively. Find the length of each parallel fillet weld.
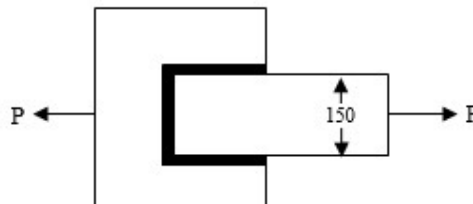

Fig. 2

Q.7(a)	What are the applications of welding in ship building industry?	[2]
Q.7(b)	What are the critical factors for success of a robot arc welding system?	[4]
Q.7(c)	State the advantages and limitations of automatic welding process.	[6]