



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (CT)/SEM-5/CT-506/2010-11

2010-11

CERAMIC COATING

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Very Short Answer Questions)

1. Answer any *ten* of the following very briefly : $10 \times 1 = 10$

- i) What is surface engineering ?
- ii) What is vitreous coating ?
- iii) Why is B_2O_3 an essential material for enamel glass ?
- iv) What is pickling ?
- v) What is neutralization ?
- vi) State one important role of electrolytes in enamel preparation.
- vii) Why is the ageing of slip essential before application on metal surface ?



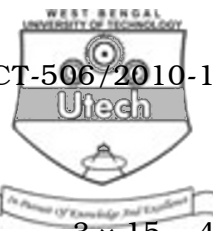
- viii) What are the oxides used in ground coat for good adhesion ?
- ix) What type of steel is used for direct on enameling ?
- x) Mention one important role of ground coat.
- xi) State one important role of PbO on vitreous coating.
- xii) What is degree of opacification ?

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What are the differences between glaze and enamel ? What are the differences between vitreous coating and glass ceramic coating ? $2\frac{1}{2} + 2\frac{1}{2}$
3. State the sources and important properties imparted by the following oxides in vitreous coating composition (any *three*) : B_2O_3 , ZrO_2 , CaO , Al_2O_3 and TiO_2 .
4. Mention the objectives of fritting of enamel batch. Why are opacifiers used in the enamel composition ? $2 + 3$
5. Thermal degreasing is preferred to chemical degreasing. Justify. Thermal degreasing in reducing atmosphere is advantageous. Justify. $3 + 2$
6. How does ordinary glass differ from enamel glass ? The enamel composition for steel sheet is not suitable for aluminum metal. Why ? $2\frac{1}{2} + 2\frac{1}{2}$
7. Mention the essential condition for the good bonding of enamel slip with metal. Oxidizing atmosphere is essential for enamelling reaction. Why ? $2\frac{1}{2} + 2\frac{1}{2}$



GROUP – C

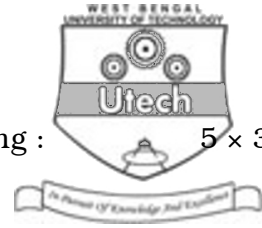
(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

8. Name the different raw materials used for enamel preparation. Draw a flow diagram of enamel slip preparation and its application on metal surface. What is the role of electrolytes in enamel batch ? What are the properties to be controlled for coating, interface and substrate before applying coating ? $5 + 4 + 2 + 4$
9. What is the purpose of vitreous coating ? State some applications of vitreous coated ware in various fields. What are the advantages and disadvantages of vitreous coating ? What is glass ceramic coating ? State the advantages of it. $2 + 5 + 5 + 3$
10. Pretreatment of metal sheet is essential before coating. Justify. Discuss in short the preparation of 1 – 2 mm steel sheet for vitreous/glass ceramic coating. What is direct on enamelling ? Which acid do you prefer in pickling and why ? If the pickling is done for a long time, what will be its effect on the enamelling ? $4 + 5 + 2 + 2 + 2$
11. Describe the causes and remedies for the following defects : 5×3
- a) Flaking
 - b) Fish scale
 - c) Hair crack
 - d) Copper heading
 - e) Orange peeling.

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12. Write short notes on any *five* of the following :



5 × 3

- a) Ni-deposition
- b) Aluminium enamel
- c) Reaction of enamel during firing
- d) Reactions occur during firing of ground coat of vitreous coating
- e) Advantages and disadvantages of inhibitors
- f) Physical vapour deposition
- g) Advantages and disadvantages of sputtering
- h) Advantages of chemical vapour deposition.

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