Total No. of Questions : 3]

SEAT No. :

P1387

[Total No. of Pages : 1

[5439]-101
M.Sc.
BIOTECHNOLOGY
BT-101: Advanced Biological Chemistry
(2013 Pattern) (Semester - I) (Credit System)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt any Four of the following. **[20]**

a) Write a note on peptidoglycan.

b) Explain various factors influencing stability of secondary structure of protein.

c) Explain role of metabolic engineering in Xenobiotics.

d) Differentiate between nutritional disorders Marasmus and Kwashiorkor.

e) Giving suitable example explain glycosylation of protein.

f) State various application of terpenoids.

Q2) Attempt any four of the following. **[20]**

a) Giving suitable example explain role of lipid as a signal molecule.

b) Write a short note on Gouty arthritis.

c) In detail explain soxhlet method for extraction of secondary metabolic.

d) In detail explain protein ubiquitination.

e) Write a note on metabolic flux.

f) Write a note on integration of metabolism.

Q3) Answer any one of the following. **[10]**

a) What is enzyme kinetics and in detail discuss various factors affecting it?

b) Discuss shikimate pathway in detail.

Total No. of Questions : 3]

SEAT No. :

P1388

[Total No. of Pages : 1

[5439]-102
M.Sc. - I
BIOTECHNOLOGY
BT - 102 : Molecular Biology
(2013 Pattern) (Credit System) (Semester - I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to right indicate full marks.***

Q1) Write self explanatory notes on any four of the following: **[20]**

a) Processed Psendogenes and non processed Psendogenes.

b) Non homologous end joining (NHEJ)

c) Alternative splicing

d) Glycation in proteins

e) Long terminal replats (LTR)

f) Cot curve

Q2) Attempt any four of the following: **[20]**

a) Explain in brief "Nucleotide Excission Repair (NER).

b) Why are alkylating agents mutagenic?

c) Explain the phenomenon of codon biased.

d) Write a note on "Initiation of transcription" by RNA Pol II.

e) Describe m-RNA processing mechanism in brief.

f) How is initiation process of translation regulated in eukaryotes?

Q3) Attempt any one of the following: **[10]**

a) Explain in detail various ways of gene regulation in eukaryotes.

OR

b) Describe in detail the mechanism of replication process in eukaryotes.

Total No. of Questions : 3]

SEAT No. :

P1389

[Total No. of Pages : 1

[5439]-103
M. Sc. - I
BIOTECHNOLOGY
BT - 103 : Environmental Biotechnology
(2013 Pattern) (Credit System) (Semester - I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labelled diagram wherever necessary.***

Q1) Attempt any four of the following : **[4 × 5 = 20]**

a) Justify need for bioremediation of pesticides/insecticides.

b) Comment on national ambient air quality standards.

c) What is remote sensing? Describe different types of remote sensing based on the energy source used.

d) Describe factors affecting process of bioremediation.

e) Explain with neat & labelled diagram construction & operation of IMHOFF TANK.

f) Comment on management of metal pollution.

Q2) Write notes on (any 4) : **[4 × 5 = 20]**

a) Application of GIS in agriculture & forestry.

b) The Rio declaration.

c) Types of Plumes.

d) Pond treatment processes.

e) Bioremediation of underground water

f) Sludge stabilization

Q3) Answer any one of the following :

a) Give an account of advanced treatment of waste water. **[8]**

b) Insitu and exsitu bioremediation. **[2]**

OR

a) Discuss guidelines & key important activities of EIA. **[8]**

b) What are index organisms of sewage? State it's importance. **[2]**

Total No. of Questions : 3]

SEAT No. :

P1390

[Total No. of Pages : 1

[5439]-104
M.Sc.-I
BIOTECHNOLOGY
BT-104 : Cell Biology
(2013 Pattern) (Semester - I) (Credit System)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer any four questions. **[4×5=20]**

a) Write a note on fluidity of lipid bilayer.
b) Describe the mechanism of symport with example.
c) Give an account on structure and functions of peroxisomes.
d) Write a note on plasmodesmata.
e) Give a brief account on applications of TEM.
f) Explain the biogenesis of cell wall.

Q2) Answer any four questions. **[4×5=20]**

a) Explain the structure and function of nuclear pore complex.
b) What are microtubules? Add a note on structure and polymerization of microtubules.
c) Discuss the molecular events during mitosis.
d) Explain the role of Second messengers in cell signalling with examples.
e) Explain retrograde transport.

Q3) Answer any one question. **[1×10=10]**

a) Give a detailed account on cyclic photophosphorylation?
b) Explain different types plasma membrane receptors involved in cell signalling.

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Total No. of Questions : 3]

SEAT No. : ____

P1391

[Total No. of Pages : 1

[5439]-201
M.Sc.
BIOTECHNOLOGY
BT - 201 : Genetic Engineering
(2013 Pattern) (Semester - II) (Credit System)

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be draw wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt any four notes of the following: **[20]**

a) Lambda phage as a cloning vector.
b) Hot start PCR.
c) Restriction enzymes.
d) In-Vino gene therapy.
e) Transgenic animals.
f) Colony hybridization.

Q2) Answer the following: (any four) **[20]**

a) Explain the strategy for construction of genomic DNA library.
b) Describe the mechanism for the use of shuttle vectors in genetic engineering.
c) Give a comparative account on genetic and physical mapping.
d) Explain the technique of restriction amplified polymorphic DNA as genetic marker.
e) Explain Baculovirus as a expression vector.
f) Discuss how will you proceed for optimization of PCR reaction.

Q3) Answer any one of the following: **[10]**

a) Discuss the use of geometric engineering in the production of inductivelly important product (any one).
b) Explain how automation in DNA sequencing method revolutionarized the completion of human genome project.

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Total No. of Questions : 2]

SEAT No. :

P1392

[Total No. of Pages : 1

[5439]-202
M.Sc.
BIOTECHNOLOGY
BT - 202 : Immunology
(2013 Pattern) (Semester - II)

Time : 1½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to right indicate full marks.***
3) ***Draw the sketches wherever necessary.***

Q1) Attempt any three of the following: **[15]**

a) Distinguish between MHC - I and MHC - II.

b) With suitable illustration, write a note on thymus.

c) Write a self explanatory note on delayed type of hypersensitivity.

d) Discuss functioning of widal test in diagnosis of enteric fever.

e) Write a note of T_C cell on its killing of target cell.

Q2) Attempt any one of the following: **[10]**

a) Explain in detail, different Classes of Antibody, add a note on its functions.

OR

b) Describe the classical and alternate pathway of complement proteins.

Total No. of Questions : 3]

SEAT No. :

P1393

[Total No. of Pages : 1

[5439]-203
M.Sc. - I
BIOTECHNOLOGY
BT - 203 : Principles of Bacteriology and Virology
(2013 Pattern) (Credit System) (Semester - II)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt any four of the following: **[20]**

a) Enlist methods of sterilization. Describe sterilization by using radiations.

b) Explain pathogenicity of Mycobacterium tuberculosis.

c) Comment on cultivation of plant viruses.

d) How infectivity assays can be used for quantification of viruses?

e) Explain Triad model of epidemiological studies.

f) Explain in detail bacterial cell division.

Q2) Attempt any four of the following: **[20]**

a) Explain role of 16s rRNA sequence analysis in bacterial taxonomy.

b) Describe in detail cultivation of anaerobic bacteria.

c) How do viruses induce cancer? Explain with suitable example.

d) Explain with suitable examples types of viral vaccines.

e) Discuss ecological and practical importance of cyanobacteria.

f) Explain lytic cycle of bacteriophages.

Q3) Attempt any one of the following: **[10]**

a) Describe virulence factor in bacteria using suitable examples.

b) What are the objectives & guidelines set by ICTV for viral classification?

Total No. of Questions : 3]

SEAT No. :

P1394

[Total No. of Pages : 1

[5439]-204
M.Sc. - I
BIOTECHNOLOGY
BT - 204 : Plant Biotechnology
(2013 Pattern) (Credit System) (Semester - II)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn whenever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer any four questions: **[4 × 5 = 20]**

a) Explain Agrobacterium mediated gene transfer.

b) Write the role of transgenic fungi for biofuel production.

c) "Manipulation of photosynthesis used to increase yield". Justify.

d) Describe Micropropagation of ornamental plants.

e) Explain the strategies used to increase industrially important enzyme from Aspergillus sps.

f) "Pure lines can be generated by plant tissue culture" Justify.

Q2) Write notes on following (any four): **[4 × 5 = 20]**

a) Somatic hybridization

b) Fungal resistant plant

c) Edible vaccines

d) Artificial seeds

e) Nutraceuticals

f) Transgenics for protein improvement

Q3) Attempt any one of the following : **[1 × 10 = 10]**

a) Explain different strategies used to develop insect resistant plant.

b) Give detail account of algal transgenics. Add a note on their applications in human welfare.

Total No. of Questions : 3]

SEAT No. :

P1395

[Total No. of Pages :1

[5439]-301
M.Sc. - II
BIOTECHNOLOGY
BT - 301 : Animal Biotechnology
(2013 Pattern) (Semester - III) (Credit system)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following (any four) **[4×5=20]**

a) Mention different types of contamination in animal tissue culture and comment on different methods of detection.

b) What are balanced salt solutions? Explain role of different components Add a note on their applications.

c) Elaborate any 1 method of artificial breeding.

d) Give a brief account an organotypic & histotypic cultures.

e) Explain any two methods of genetic modification of animal cell line.

f) Write a note on characteristics of transformed cells.

Q2) Write short notes on (Any Four) **[4×5=20]**

a) Comparative account of adult & embryonic stem cells.

b) Application of animal cell lines in pharmaceutical protein production.

c) Cell lineage.

d) Any one method of generation of knock out line.

e) Enzymatic methods of tissue disaggregation.

f) Antigenic markers in characterization of cells.

Q3) Answer any one: **[1×10=10]**

a) Write about long term maintenance of stem cells also mention any two methods of identification of stem cells.

b) Enlist different methods of cell sorting Elaborate any 2 methods of cell sorting with appropriate examples.

Total No. of Questions : 3]

SEAT No. :

P1396

[Total No. of Pages : 1

[5439]-302
M.Sc. - II
BIOTECHNOLOGY
BT - 302 : Bioprocess Engineering and Fermentation Technology
(2013 Pattern) (Credit System) (Semester - III)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following (any four): **[20]**

a) Comment on 'Bubble column bioreactor'.

b) Explain the appropriate methods used for the measurement and control of microbial biomass.

c) Explain parasexual cycle and give its applications in strain improvement.

d) Describe effluent disposal strategey used for textile industry.

e) Comment on applications of microbes in biofuels.

f) What is broth rheology? Describe factors affecting broth rheology.

Q2) Answer the following (any four): **[20]**

a) Explain the process of continuous sterilization.

b) Comment on Plackett Burman design.

c) Explain role of recombinant DNA technology in strain improvement.

d) Explain the need of precursor and inducer addition in Fermentation media with suitable examples.

e) Comment 'Batch culture kinetics'.

f) Explain the concept of P.I.D. control.

Q3) Answer the following (any one): **[10]**

a) Discuss production, recovery and applications of Vitamin C.

b) What is correlation between mass transfer and operating variables of fermentation? Explain it briefly.

Total No. of Questions : 2]

SEAT No. :

P1397

[Total No. of Pages : 1

[5439]-303

M. Sc. - II

BIOTECHNOLOGY

BT - 303 : Database Management and Intellectual Property Rights in Biotechnology

(2013 Pattern) (Semester - III) (Credit System)

Time : 1½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labelled diagram wherever necessary.***

Q1) Answer any three : **[3 × 5 = 15]**

a) What is datamining? Explain the role of data mining in knowledge discovery process.

b) Write a note on Paris convention.

c) Discuss the procedure for filing 'Product patent'.

d) Explain in brief plant breeders rights.

e) Give procedure for recording and reporting of serious Adverse Event.

Q2) Answer any one : **[1 × 10 = 10]**

a) Explain different international treaties for protection of Intellectual property Rights.

b) Define database. Discuss advantages of DBMS over flat file system. Add a note on Pubmed.

Total No. of Questions : 3]

SEAT No. : ____

P1398

[Total No. of Pages : 1

[5439]-304
M.Sc.-II
BIOTECHNOLOGY
BT-304 : Advanced Genetics
(2013 Pattern) (Semester - III) (Credit System)

Time : 2½ Hours] ***[Max. Marks : 38***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer any two: **[2×5=10]**

a) Write a note on genetic basis of gametophytic self in compatibility.
b) Explain in detail inheritance through mitochondria with a suitable example.
c) Write a note on use of Karyotyping as a diagnostic tool to detect chromosomal disorders.
d) Explain the heritability of commercially important quantitative traits.

Q2) Answer any four: **[4×5=20]**

a) Explain the genetic basis of inbreeding depression.
b) Write a note on genetical aspects of somaclonal variations.
c) Drosophila is a model system in genetics Eleborate.
d) Write a note on heteromorphic self incompatibility.
e) Write a note on genetically inherited cancers.
f) Hardy weinberg equilibrium is disturbed due to mutations. Justify.

Q3) Answer any one: **[1×8=8]**

a) Enlist various applications of Hardy Weinberg law.
b) The ability to taste PTC is due to a single dominant allele “T”. In a population of 215 individuals, 150 could detect the better taste of PTC and 65 could not. Calculate all allelic and genotypic frequencies.
c) Write a note on various disorders caused due to numerical chromosomal aberrations.

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Total No. of Questions : 2]

SEAT No. : ____

P1399

[Total No. of Pages : 1

[5439]-305
M.Sc. - II
BIOTECHNOLOGY
BT - 305 : Bioinformatics
(2013 Pattern) (Semester - III) (Credit System)

Time : 1½ Hour] ***[Max. Marks : 25***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labeled diagrams wherever necessary.***

Q1) Solve any three out of five of the following: **[3 × 5 = 15]**

a) Define algorithm. Explain the principle of Needleman - Wunsch algorithm for global alignment.

b) Explain structure function relationship in proteins and elaborate on the role of protein structure visualization tools.

c) Write a note on :

i) SCOP

ii) CATM

d) Explain the role of immunoinformatics in epitope prediction.

e) Define database. Explain literature databases with its significance.

Q2) Solve any one out of two of the following: **[1 × 10 = 10]**

a) Explain the principle of multiple sequence alignment and add a note on its applications giving appropriate examples.

b) Describe the role of structural bioinformatics in protein research. Elaborate on structure prediction tools and steps involved in structure prediction.

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Total No. of Questions : 3]

SEAT No. : ____

P1400

[Total No. of Pages : 1

[5439]-401
M.Sc.
BIOTECHNOLOGY
BT - 401 : Genomics and Proteomics
(2013 Pattern) (Semester - IV) (Credit System)

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat labelled diagram must be drawn wherever necessary.***

Q1) Answer any four of the following: **[4 × 5 = 20]**

a) Describe the principle and working of DNA microarrays.
b) Elaborate the role of model organisms in comparative genomics.
c) Write a note on Human Genome Project.
d) Discuss the significance of various Bioinformatic tools in genomics.
e) Write a note on Gene Annotation.
f) Describe the merits and demerits of shot gun sequencing.

Q2) Attempt any four of the following: **[4 × 5 = 20]**

a) What is ISO Electric Focussing? Give its significance in 2-D Electrophoresis.
b) Discuss various methods used for protein digestion.
c) Describe various tools used in structural proteomics.
d) Discuss methods used in protein characterisation.
e) Describe various protein databases.
f) Write a note on protien micro arrays.

Q3) Attempt the following: (any one) **[10]**

a) Explain structural genomics w.r.t. goals, methods and applications.
b) Discuss in detail how proteomics help in disease diagnosis.

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Total No. of Questions : 3]

SEAT No. :

P1401

[Total No. of Pages : 1

[5439]-402
M.Sc. - II
BIOTECHNOLOGY
BT - 402 : Adavnced Biochemical and Biophysical Techniques
(2013 Pattern) (Semester - IV) (Credit System)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat labelled diagram must be drawn wherever necessary.***
3) ***Figures to right indicate full marks.***

Q1) Answer the following (any four): **[20]**

a) Write a note on different techniques used for fixation and staining in electron microscopy.

b) Explain immunoprecipitation and give its application.

c) Write a short a note on electromagnetic Radiations.

d) What is fluorescence spectroscopy and give its application.

e) What is x-ray Crystallography? State its principle and use in biological science.

f) What is Fluoroscent In-situ hybridization and elaborate on its application.

Q2) Answer the following (any four): **[20]**

a) What is radioactivity? Explain various ways in which radioactive rays interact with matter.

b) State the principle of 2-D-electrophoresis and application in protein biochemistry.

c) What is circular Dichorism? Give its importance in structure determination.

d) Write a note on MALDI - TOF.

e) State the principle of Gas Liquid Chromatography (GLC) and give its application.

f) What is Radioimmunoassay and comment on its application.

Q3) Answer any one of the following: **[10]**

a) What is N.M.R spectroscopy? Explain its principle. Elaborate on the information obtained from NMR data for structural analysis with suitable examples.

b) What is TEM? Explain the principle and working of TEM. Add a note on its application as an analytical tool.

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Total No. of Questions : 2]

SEAT No. :

P1402

[Total No. of Pages : 1

[5439]-403
M.Sc. - II
BIOTECHNOLOGY
BT - 404 : Nanobiotechnology
(2013 Pattern) (Credit System) (Semester - IV)

Time : 2½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw the sketches wherever necessary.***

Q1) Attempt any three of the following: **[3 × 5 = 15]**

a) Explain the use of UV-VIS spectroscopy in characterization of Nanomaterials.

b) Discuss in detail Sol-Gel method for synthesis of nanoparticles.

c) Explain the use of nanomaterial in Gene therapy.

d) With an suitable example Justify use of inorganic nanoparticles for drug delivery.

e) Write a note on use of microorganisms for synthesis of Nanomaterial and its advantage.

Q2) Attempt any one of the following: **[1 × 10 = 10]**

a) Explain with suitable examples hoxy nanomaterial-cell interaction is influenced with manifestation of surface modification.

b) Enlist different physical methods for synthesis of Nanoparticles. Explain synthesis of Nanoparticles by vapour deposition method in detail.

Total No. of Questions : 3]

SEAT No. :

P1403

[Total No. of Pages : 1

[5439]-404
M.Sc. - II
BIOTECHNOLOGY
BT - 405 : Animal Development & Stem Cell Technology
(2013 Pattern) (Semester - IV) (Credit System)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat & labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Write short notes on (Any 4): **[4 × 5 = 20]**

a) Acrosomal reaction in Sea urchin.
b) Tissue engineering.
c) Hematopoeitic stem cell lineage.
d) Blastulation in Drosophila.
e) Capacitation of sperms.
f) Stem cell niche.

Q2) Answer the following (Any 4): **[4 × 5 = 20]**

a) Differentiate between embryonic stem cells & embryonic carcinoma cells.
b) Give a brief account of cell cycle regulation in stem cells.
c) Write the role of homeogic genes in pattern formation in Drosophila.
d) Describe rde of calcium in early development.
e) Write a note on model of limb regeneration.
f) Explain mechanism and significance of cortical reaction.

Q3) Answer the following (Any 1): **[1 × 10 = 10]**

a) Explain in detail process of gastrulation in chick embryo development.
b) Give a detailed account on applications of stem cells in treatment of neurodegenerative disorders.

Total No. of Questions : 3]

SEAT No. : ____

P1404

[Total No. of Pages : 1

[5439]-405
M.Sc.
BIOTECHNOLOGY
BT - 406 : Agricultural Biotechnology
(2013 Pattern) (Semester - IV) (Credit System)

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Attempt any four of the following: **[4 × 5 = 20]**

a) What are somaclonal variations? Discuss their significance in crop improvement.
b) Explain with suitable examples, the use of bioreactors in plant production.
c) What is RAPD? Explain the methodology involved in carrying out RAPD.
d) Discuss the use of transgenic technology for the production of plantibodies.
e) Explain the concept of future crops with suitable examples.
f) Discuss the role of agribiotech in improvement of oilseed crops.

Q2) Attempt any four of the following: **[4 × 5 = 20]**

a) Write a note on QTL based marker assisted selection for producing high yielding plants.
b) What are high impact crops? Discuss the use of genetic engineering for improvement of high impact crops.
c) Explain the methodology involved in Agrobacterium mediated genetic transformation of plants.
d) What are triploids? How triploids can be produced using biotech tools?
e) Justify how embryo rescue is an effective way for producing viable plants.
f) Enlist various methods of virus indexing, explain any one method in detail.

Q3) Attempt any one of the following: **[1 × 10 = 10]**

a) Discuss in detail the use of genetic engineering for production of abiotic stress tolerant transgenic plants. Cite suitable examples.
b) Explain with detailed methodology, chloroplast engineering for production of therapeutic proteins.

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