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MDE/D-17 4305

CLASSICAL MECHANICS

Paper : I

Time : Three Hours] [Maximum Marks : 55

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

1. (a) In scattering experiments, we are generally interesting in to measure differential scattering cross-section rather than total scattering cross-section. Why ? 3

(b) Show that the constancy of areal velocity is a general property for central force problems. 3

(c) Differentiate between point and identity transformations. 3

(d) What is the advantages of using generalized co-ordinates in classical mechanics ? 2

Unit I

2. (a) Deduce Lagrange's equation motion from Hamiton's principle for conservative systems. 6

(b) Write the Lagrangian for a particle moving under a central force and find the corresponding equation of motion. **5**

3. Find the equations of motion for non-holonomic system using the Lagrange's method of undermind multipliers. Also solve the problem of a simple pendulum using this method. **11**

Unit II

4. Derive the equation of orbit for an inverse square law of force and then deduce the equation for elliptical orbits. **11**

5. (a) Show that force under which the particle is moving is central if it describes a conic : **5**

$$r = \frac{p}{1 + \epsilon \cos\theta}, \text{ Take } \epsilon \text{ and } p \text{ as constants.}$$

(b) State and prove Virial Theorem. Also list its applications. **6**

Unit III

6. (a) State and prove Euler's theorem. **5**

(b) What are orthogonal transformations ? Discuss the properties of transformation matrix. **6**

7. Deduce the equations of motion for a symmetrical top with one point fixed. Also establish a condition for the stability of a sleeping top. **11**

Unit IV

8. (a) What do you understand by canonical transformation ? Find a condition for a transformation to be canonical. **6**

(b) Under what conditions the transformation $Q = \alpha q$; $P = \beta p$ is canonical ? Also find the new Hamiltonian for this case. **5**

9. Describe the Hamilton-Jacobi theory and hence solve the problem of a simple harmonic oscillator using this theory. **11**

(b) Find out classes of a group of six elements E, A, B, C, D, F having the following group multiplication table : 6

	E	A	B	C	D	F
E	E	A	B	C	D	F
A	A	B	E	D	F	C
B	B	E	A	F	C	D
C	C	F	D	E	B	A
D	D	C	F	A	E	B
F	F	D	C	B	A	E

9. Describe various steps involved in the construction of character table and hence construct the character table for symmetry group of equilateral triangle. 11

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MDE/D-17 4306

APPLIED MATHEMATICS

Paper : II

Time : Three Hours] [Maximum Marks : 55

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

1. (a) Prove that : 3

$$\cos(x\sin\theta) - J_0(x) + 2\cos 2\theta J_2(x) + 2\cos 4\theta J_4(x) + \ldots$$

(b) Check whether the function $f(Z) = \mathrm{Re}(Z)$ is analytic or not. 2

(c) Find the sum $S = \sqrt{5} + \sqrt{7} + \sqrt{11} + \sqrt{13}$ upto three decimal places. Calculate the absolute error and relative error in S. 3

(d) Show that a set matrices $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$ form a group under matrix multiplication. 3

Unit I

2. (a) Using generating function obtain an expression for Bessel's function of order n. **5**

(b) Find expressions for $J_{\frac{1}{2}}(x)$ and $J_{-(1/2)}(x)$ in terms of trigonometric functions and hence show that : **6**

$$\left[J_{\frac{1}{2}}(x)\right]^2+\left[J_{-\frac{1}{2}}(x)\right]^2=\frac{2}{\pi x}$$

3. (a) Express $f(x) = x^4 + 2x^3 + 2x^2 - 3$ in terms of Legendre's polynomials. **5**

(b) Establish the orthogonality property of Legendre polynomials. **6**

Unit II

4. (a) Prove the recurrence relation $xL'_n(x) = nL_n(x) - nL_{n-1}(x)$ for Laguerre's polynomials. **5**

(b) Prove that : **6**

$$\int_{-\infty}^{\infty} e^{-x^2} H_n(x) H_m(x) dx = \begin{cases} 0 & \text{if } m \neq n \\ \sqrt{\pi} 2^n n! & \text{if } m = n \end{cases}$$

5. (a) Describe the Laurent's series expansion of a function of complex variable. **6**

(b) Using the method of residue evaluate : **5**

$$I = \int_0^{\infty} \frac{\sin x dx}{x\left(x^2+a^2\right)}; \qquad a > 0$$

Unit III

6. (a) State and prove various properties of Laplace transform. **5**

(b) Find the inverse Laplace transform of $\frac{1+2s}{(s+2)^2(s-1)^2}$. **6**

7. (a) Describe in detail the Gaussian law of error. **5**

(b) Using the method of least square, fit a curve of the form $y = \frac{x}{a+bx}$ to the following data (3, 7.148), (5, 10.231), (8, 13.509), (12, 16.434). **6**

Unit IV

8. (a) Under matrixs multiplication, for the following four matrices, prepare group multiplication table :

$$E = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, A = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}, B = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}, C = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}.$$

5

9. (a) Calculate the recoil velocity and energy of free Mossbauer nucleus ^{119}Sn when emitting a γ-ray of frequency 5.76×10^{19} Hz. What is the Doppler shift of the γ-ray frequyency to an outside observer ? Avogadro number is 6.023×10^{23} mol^{-1}. **4**

(b) What is chemical shift ? **3**

(c) What is Lamb Mossbauer factor ? **4**

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MDE/D-17 4307

APPLIED SPECTROSCOPY

Paper : III

Time : Three Hours] [Maximum Marks : 55

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. Q. No. **1** is compulsory.

(Compulsory Question)

1. (a) Define overtones and combinations frequencies. **3**

(b) Why don't the major constituents of air absorb infrared radiation ? **2**

(c) Why microwave source and technique have to be applied for the observation of ESR spectra ? **2**

(d) What effect would raising the temperature have on the intensity of Stokes and anti-Stokes lines ? **2**

(e) Define relaxation process and relaxation time. **2**

Unit I

2. (a) Obtain an expression for the rotational energy levels of a diatomic molecule, assuming it as a non-rigid rotator. Discuss its spectrum. How is its spectrum different from rigid rotator ? **8**

   (b) What is the effect of isotopic substitution on energy levels of diatomic molecule ? **3**

3. (a) Derive an expression for energy level of a diatomic molecule, assuming it as a vibrating rotator. Discuss its spectrum. **7**

   (b) What are Hot Bands ? Why are they so called ? **4**

Unit II

4. (a) In H_2 molecule the separation between adjacent rotational Raman lines is 4B whereas in O_2 it is 8B. Why ? **4**

   (b) What is Raman effect ? Discuss the pure rotational Raman Spectra exhibited by a linear molecule. **7**

5. (a) From the value for B_0 of $1.923\,604 \pm 0.000\,027\ cm^{-1}$, obtained from the rotational Raman spectrum of $^{14}N^{15}N$: **8**

   (i) Calculate the bond legnth r_0.

   (ii) Why does it differ from r_0 from $^{14}N_2$?

   (iii) Would the values of r_e differ ?

   (iv) Would there be an intensity alternation in the spectrum of $^{14}N^{15}N$?

   (b) What would the ideal source to be used for measuring Raman Spectra ? **3**

Unit III

6. (a) What is Frank-Condon principle ? How it accounts for intensity variation of vibrational electronic spectra ? **5**

   (b) What is *g*-factor ? What factors affecting *g*-value ? **6**

7. (a) The ESR spectrum of an unpaired electron interacting with two equivalent protons shows three lines with intensities 1 : 2 : 1. Why ? **4**

   (b) Explain the vibrational coarse structure of electronic spectra. **7**

Unit IV

8. (a) Outline the principle of NMR Spectroscopy. Discuss the instrument of a NMR spectrometer and its utilization for characteristics. **7**

   (b) What is recoil energy loss ? **4**

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MDE/D-17 4308

LASER PHYSICS

Paper : IV

Time : Three Hours] [Maximum Marks : 55

Note : Attempt *Five* questions in all. Take *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (i) What are spontaneous transitions ? **2**

(ii) What is meant by active material in laser ? **2**

(iii) What is a Q-switched laser ? **2**

(iv) Explain the role of He in He-Ne laser. **2**

(v) Explain laser induced fussion. **3**

Unit I

2. (a) Discuss homogeneous and inhomogenous broadening in lasers. **6**

(b) What are Einstein coefficients ? Derive a relation between them. **5**

3. (a) Describe different pumping schemes in lasers. **6**

(b) Explain the process of population inversion. **5**

Unit II

4. Discuss the principle, construction and working of Fabry Perot laser. **11**

5. Explain in detail an optical resonator with spherical mirrors. **11**

Unit III

6. Explain the principle, construction and working of a YAG laser. **11**

7. Explain the principle, construction and working of a free electron laser. **11**

Unit IV

8. (a) Discuss spatial frequency filtering. **6**

(b) Write a note on polography. **5**

9. Discuss second harmonic generation and phase matching. **11**

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MDQ/D-17 5009

MATERIAL SCIENCE-I

Paper I

Time : Three Hours] [Maximum Marks : 55

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

Compulsory Question

1. (a) Are planar defects equilibrium defects ? Give reasons for your answer. 3

(b) What are ferroelectric domains ? 3

(c) Define Orowan mechanism. 2

(d) In which frequency region electronic polarization is effective ? Explain. 3

Unit I

2. (a) Calculate the elastic strain energy stored in a cylindrical solid of length l and radius R, when a screw dislocation is present at a distance r from the axis. 6

(b) What is Frank's rule ? Use it to show that super dislocations rarely exist in crystals. **5**

3. (a) Show that for a cubic structure the interplanar distance 'd' in terms of miller indices and the cell edge 'a' is given by $d = \sqrt{\frac{a^2}{h^2+k^2+l^2}}$. **5**

(b) How dislocations multiply in crystals ? **6**

Unit II

4. (a) Define fracture in materials. How ideal fracture stress for a material can be calculated ? **5**

(b) A glass plate has a sharp crack of length 2 μm in its surface. At what stress will it fracture when a tensile force is applied perpendicular to the plane of the crake ? (Young's modulus 70 GNm^{-2} and surface energy = 0.3 Jm^{-2}.) **6**

5. (a) What do you understand by Schmid's law ? Discuss in detail. Also explain the significance of Schmid factor. **5**

(b) What do you understand by a grain and grain boundary ? Discuss the mechanism of strengthening due to grain boundaries. **6**

Unit III

6. (a) What are pyroelectric materials ? **3**

(b) Obtain the relationship between dielectric constant and electronic polarizability, for crystal structures for which the Lorentz local field exists. **8**

7. (a) Obtain an expression for local electric field at an atomic site. How is it different from Macroscopic electric field ? **8**

(b) What are ferroelectric materials ? **3**

Unit IV

8. (a) What are soft optical phonons ? **4**

(b) Discuss theory of spontaneous polarization in Barium Titanate. **7**

9. (a) What is an order parameter in Landau's theory of phase transitions ? Give some examples. **6**

(b) How does the order parameter depend on temperature ? **5**

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MDQ/D-17 **5011**

THIN FILMS AND VACUUM TECHNIQUES

Paper : III

Time : Three Hours] [Maximum Marks : 55

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

(Compulsory Question)

1. (a) What is the mechanism of Sublimation ? Explain. **2½**

(b) What is cathode contamination problem ? Explain. **2**

(c) Why does diffusion pump always work with a backing of rotary pump ? **2**

(d) Define the term Vacuum. What are its units ? **2**

(e) Can you use any material under a vacuum chamber ? Discuss. **2½**

Unit I

2. Describe in detail various types of thermal evaporation sources using suitable diagrams. 11

3. Discuss the basic principle, working and mechanism of the Laser evaporation technique for thin film deposition. Give the minimum pressure at which films can be deposited using this technique and the materials that can be deposited using this technique. 11

Unit II

4. (a) Explain the influence of pressure, current and voltage on deposition rate. 5

   (b) Discuss various techniques for the measurement of the thickness of a thin film. 6

5. (a) Discuss the basic principle and mechanism involved in Chemical Vapour Deposition technique for thin film deposition giving suitable diagram. Name the materials that can be deposited using this method. 8

   (b) How does Chemical Vapour Deposition method differ from Electrodeposition technique ? Discuss. 3

Unit III

6. (a) Discuss the basic principle, construction, working and methodology involved in a Getter pump with suitable diagram. 7

   (b) Give the minimum pressure that can be achieved using Getter pump. Discuss the process of measurement of this pressure. 4

7. (a) Discuss the basic principle, construction and working of the Rotary pump with a suitable diagram. 4

   (b) Explain the principle and working of a Vacuum Gauge for measuring vacuum of $\sim 10^{-4}$ Torr. 4

   (c) What do you understand by the process of Leak Detection ? Explain. 3

Unit IV

8. Describe the vacuum systems which can be used in instrumentation, space, pharmaceutical and cryogenic industries. Discuss their applications in each of these industries. 11

9. What are the characteristics of materials for their use under vacuum ? Describe the materials along with its characteristics, which can be used in different vacuum systems. 11

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MDQ/D-17 **5012**

SURFACE MODIFICATION AND CHARACTERIZATION TECHNIQUES

Paper IV

Time : Three Hours] [Maximum Marks : 55

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

Compulsory Question

1. (a) What is the difference between ion implantation and diffusion ? Explain. **2½**

(b) Can you identify a low '*z*' impurity using RBS technique ? Discuss. **2½**

(c) What is the principle of electron multiplier ? Discuss. **2**

(d) How does ion implantation affect the microstructure of a material ? **2**

(e) How the wavelength of electron beam used in TEM can be calculated ? **2**

Unit I

2. (a) Discuss the process of ion implantation giving a suitable diagram. 4

   (b) 100 keV Ar+ ions are implanted in Iron and Aluminium Simultaneously. Discuss in which out of these two materials, Ar^+ will have more projected range. 4

   (c) What do you understand by the process of ion beam mixing ? Explain. 3

3. (a) Discuss basic mechanism of Radiation Damage in solids. 4

   (b) Discuss the effects of ion implantation on the electrical and optical properties of materials. 7

Unit II

4. (a) Discuss the process of Depth Profiling using RBS Technique. 7

   (b) What do you understand by the shape of backscattering spectrum ? Discuss. 4

5. (a) What do you understand by Electron Energy Loss Spectroscopy ? Explain its basic principle and working. Highlight some of its applications. 8

   (b) Explain the effect of thin film islanding on electron attenuation. 3

Unit III

6. Discuss the basic principle, instrumentation, working involved in Low Energy Electron Diffraction using a suitable diagram. What are its applications ? 11

7. Explain the basic principle, working and methodology involved in Glancing Angle X-ray diffraction technique with suitable diagram. Discuss some of its applications. 11

Unit IV

8. (a) Explain the basic principle of X-ray photoelectron spectroscopy (XPS) technique using schematic energy level diagram. 3

   (b) What is photoelectron energy spectrum ? How will it be used in studying the chemical shift and oxidation states of the elements in a material. 8

9. (a) Discuss the basic principle of Auger electron spectroscopy (AES) technique. 3

   (b) How will you carry out compositional analysis and depth profiling of ion irradiated samples using AES technique. 8

9. (a) What is the principle of detection of a charged particles using Solid state nuclear track detector ? Highlight the various track processing methods. **6**

(b) What is the basic principle, working and applications of ESR Dosimeter ? **5**

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MDQ/D-17 5013

RADIATION PHYSICS

Paper : V

Time : Three Hours] [Maximum Marks : 55

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) What do you understand by maximum permissible level of radiation ? **3**

(b) What is the procedure for handling the radioactive waste ? **3**

(c) What is the principle of gamma camera ? **3**

(d) Why tracks are enlarged after chemical etching in case of SSNTD ? **2**

Unit I

2. (a) What are the units of energy flux, energy fluence, cross-section and linear energy transfer ? **4**

(b) What are the different types of nuclear radiation ? How these are different from solar radiation ? 4

(c) What are the possible health hazards from nuclear radiations ? 3

3. (a) What are the conventional sources of radiation ? Give specific examples. 4

(b) What do you understand by radiation dose equivalent ? 4

(c) Highlight the type of radiation arising from cosmic rays. 3

Unit II

4. (a) Discuss in detail the radiation induced chemical changed in tissues by giving specific examples ? What are the radiation protection methods ? 8

(b) What do you understand by delayed effects of radiations ? Give two examples ? 3

5. (a) What are the various means for radioactive protection ? How the radiation hazards are assessed ? 6

(b) What are the biological effect of radiation ? How will you handle the prompt and delayed effect of radiation ? 5

Unit III

6. (a) What are diagnostic X-rays ? How they are produced and applied to X-ray imaging ? 5

(b) What is the principle of positron emission tomography (PET) What information can be deduced from this technique ? 6

7. (a) What is the basic principle of computerised axial tomography (CAT) ? What information can be obtained from this technique ? 6

(b) What are the Physiological effects of ultrasound in therapy ? Explain by giving an example. 5

Unit IV

8. (a) Explain the various possible ways for radiation dose measurement by giving the suitable example. 6

(b) What is the origin of Thermoluminescence ? What are the glow curves and highlight their importance ? 5

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MDE/D-17 **4028-S**

ADVANCED ABSTRACT ALGEBRA

M[illegible]

Time : [illegible] [Maximum Marks : 80]

Note : Attempt *five* questions in all selecting *one* question from each Section. All questions carry equal marks.

Section I

1. (a) Prove that if an infinite group G has a unique composition series then G must be a cyclic p-group.

   (b) State and prove Three Subgroup Lemma of P. Hall.

2. (a) Prove that subgroup and a factor group of a soluble group are soluble.

   (b) Prove that centre of a nilpotent group G is non-trivial and if $\{e\} \neq H \trianglelefteq G$, then $H \cap Z(G) \neq \{e\}$.

Section II

3. (a) Prove that if L is a finite extension of K and K is a finite extension of F, then :

   [illegible] $[L : F] = [L : K][K : F]$.

(b) Find the degree if the splitting field of :

$$(X^2 - 1)(X^4 - 2) \text{ over } Q.$$

4. (a) Prove that if F is a finite field then $F^* = F \setminus \{0\}$ is a cyclic group.

(b) Prove that if $Ch(F) = p \neq 0$, then $\alpha \in K/F$ is separable iff [illegible] $= F(\alpha^{p})$.

5. (a) Find the [illegible] group of X^3 [illegible] over Q.

(b) Prove that the polynomial [illegible] is not solvable by radicals over Q.

Section III

6. (a) Prove that if $T \in A(V)$ has all its ch. roots in F, then T satisfies a polynomial of degree $n = \dim_F(V)$ over F.

(b) Prove that of $T \in A(V)$ has only 0 as a ch. roots, than T is nilpotent $(\dim_F(V) < \infty)$.

7. (a) Let $p(X) \in F[X]$, be the minimal polynomial of $T \in A(V)$. Prove that if V is a cyclic module relative to T, then ∃ a basis of V in which the matrix of T is the companion matrix of $p(X)$.

(b) Prove that if $T \in A(V)$ is such that $T^2 = T$, then T is diagonalizable.

Section IV

8. (a) Let R be a ring with unity prove that :

$$\mathrm{Hom}_R(R_R, R_R) \cong R \text{ as rings.}$$

(b) Prove that rank of a finitely generated free module over a commutative ring is an invariant.

Unit V

9. (a) Prove that in [illegible] ring a nil left ideal is [illegible].

(b) [illegible] R is a Noetherian [illegible] then [illegible] $ba = 1$.

10. (a) Prove that in a Noetherian ring every ideal contains a finite product of prime ideals.

(b) Find the Abelian group generated by x, y, z, where :

[illegible]

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MDE/D-17 4030-S

TOPOLOGY AND FUNCTIONAL ANALYSIS

Paper III (MM-403)

Time : Three Hours] [Maximum Marks : 80/100 (Re.)

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section.

Section I

1. (a) Show that for any set E in a topological space, $C(E) = E \cup d(E)$, where C(E) denotes closure of E and $d(E)$, derived set of E. **8**

(b) Let (Y, ζ_Y) be a subspace of a topological space (X, ζ). Prove that a subset A of Y is closed iff $A = B \cap Y$ for some closed set B of X. **8**

2. (a) State and prove Lindelof theorem. **8**

(b) Prove that projections are open maps but need not be closed maps. **8**

3. (a) Prove that a topological space X is regular iff $\forall\ x \in X$, the set of all closed neighbourhoods of x is a base for Nx. **8**

(b) Prove that if the projection map $P : X \to X/R$ is open and R is closed in $X \times X$, then the quotient space X/R in T_2.

Section II

4. State and prove Tretze's Extension Theorem, giving full details. **16**

5. (a) State and prove ultra filter principle. **8**

(b) Prove that a topological space X is compact iff every collection of closed subsets of X with the finite intersection property has a non-empty intersection. **8**

Section III

6. (a) State and prove F. Riesz lemma. **8**

(b) Compute the dual space of the space Co. **8**

7. (a) Let $T : X \to Y$ be a bounded linear operator, where X and Y are normed spaces. Show that the adjoint operator T^X of T is linear and bounded. Also, show that $\|T^X\| = \|T\|$. **8**

(b) State and prove uniform boundedness theorem. **8**

8. (a) Prove that a normed space X is separable if the dual space X' is separable. **8**

(b) State and prove closed graph theorem. **8**

Section IV

9. (a) Show that l^p $(p \neq i)$ is not a Hilbert space. **6**

(b) State and prove Bessel's inequality. **10**

10. (a) Show that every Hilbert space is reflexive. **8**

(b) Show that a bounded linear operator $P : H \to H$ on a Hilbert space H is a projection iff P is self-adjoint and idempotent. **8**

10. (a) State and prove Hadamard's Three Circle Theorem.

(b) State and prove Great Picard Theorem. State Bieberbach's conjecture.

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MDE/D-17 4031-S

MATHEMATICS

Paper IV (MM-404)

Complex Analysis

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section. All questions carry equal marks.

Section I

1. State and proble Cauchy-Goursat theorem.

2. (a) State and prove Cauchy integral formula and use it to evaluate :

$$\int_C \frac{\sin^6 z}{\left(z-\frac{\pi}{6}\right)} dz$$

where C is the circle $|z|=1$.

(b) State and prove Liouville's theorem.

3. State and prove Taylor's theorem. Also find the Taylor series for the function $f(z)=\frac{2z^3+1}{z^2+z}$ in the neighbourhood of the point $z = i$

Section II

4. (a) State and prove Schwarz lemma.

   (b) If $z = a$ is an isolated singularity and if $f(z)$ is bounded on some deleted neighbourhood of a then show that a is a removable singularity.

5. (a) State Rouche's theorem and use it to prove that all the roots of $z^7-5z^3+12=0$ lie between the circles $|z|=1$ and $|z|=2$.

   (b) Use the method of contour integration to evaluate

$$\int_0^\infty \frac{\log\left(1+x^2\right)}{1+x^2}dx$$

Section III

6. (a) State and prove Hurwitz's theorem.

   (b) If $f(z)$ is an entire function then $f(z)=e^{g(z)}$ is also entire and $f(z)\neq 0$ conversely if $f(z)$ is an entire function which is never zero then $f(z)$ must of the form $e^{g(z)}$

7. (a) Show that $\Gamma(z)=\int_0^\infty e^{-t}t^{z-1}dt$ $Re(z) > 0$.

   (b) State and prove Mittag-Leffler's theorem.

8. (a) Define analytic continuation. Show that if a function $f(z)$ is analytic in a domain D and $f(z)=0$ at all points on arc inside D, then $f(z)=0$ throughout the domain.

   (b) Show that the series :

$$\sum_{n=0}^{\infty}\frac{z^n}{2^{n+1}} \text{ and } \sum_{n=0}^{\infty}\frac{(z-i)^n}{(2-i)^{n+1}}$$

are analytic continuation of each other.

Section V

9. (a) Define Poisson Kernel $P_r(\theta)$ and show that it satisfies the following properties :

   (i) $\frac{1}{2\pi}\int_{-\infty}^{\infty}P_r(\theta)\,d\theta=1$

   (ii) $P_r(\theta) > 0$ for all θ, $P_r(-\theta) = P_r(\theta)$ and Pr is periodic in θ with period 2π

   (iii) $P_r(\theta) < P_r(\delta)$ if $0 < \delta < |\theta| \leq \pi$

   (b) Let G be a region and let $a \in \partial_\infty G$ such that there is a barrier for G at if $f : \partial_\infty G \to R$ is continuous and u is the Person function associated with f then $\lim_{z\to a} u(z) = f(a)$.

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MDE/D-17 4337

ADVANCED ABSTRACT ALGEBRA-I

MM-401

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section. All questions carry equal marks.

Section A

1. (a) Let G be a cycle group of older n. Prove that Aut(G) is isomorphic to the group of units of the ring Z/nZ.

(b) State and prove Schreier Refinement Theorem.

2. (a) Let K be a normal subgroup of a finite group G. Prove that sylow p-subgroups of GK. are precisely of the form PK/K where $P \in syl_p(G)$.

(b) Prove that a group of older 35 is cyclic.

Section B

3. (a) Prove that $\alpha \in K \mid F$ is algebraic iff $F(\alpha) = F[\alpha]$.

(b) Find the degree of the splitting field of $(x^2 - 1)(x^4 - 2)$ over Q.

4. (a) Prove that if $F^* = F-\{0\}$ is a cyclic group, then F is a finite field.

(b) Prove that a finite normal extension is a splitting field of same polynomial.

Section C

5. (a) Prove that algebraic extension of a field of characteristic zero is separable.

(b) Let K be a finite extension of F such that K has finite number of subfields containing F. Prove that K is a simple field extension of F.

6. (a) Find the Galois group of $x^4 + 1 \in Q[x]$.

(b) State and prove Dedekind Lemma.

Section D

7. (a) Prove that a factor group of a soluvable group is soluvable.

(b) Let H be a normal subgroup of An ($n \geq 5$). Prove that if H contains one 3-cycle, then $H = An$.

8. (a) Prove that if K is the splitting field of $X^n - a \in F[x]$, then G(K|F) is a solvable group.

(b) Prove that the polynomial $X^7 - 10X^5 + 15X + 5$ is not solvable by radicals over Q.

Section E

9. (a) Write down a composition series of a cyclic group of order 45.

(b) Prove that G|δ(G) is Abelian.

(c) Find the degree of $3+\sqrt{2}$ over Q.

(d) Find the degree of the splitting field of $X^2 + 3$ over Q.

(e) Prove that the polynomial $X^2 + X + 2$ is irreducible over Z/3Z.

(f) Prove that a group of older 63 is not simple.

(g) Prove that Z/pZ is a prime field.

(h) Express $x_1^2 + x_2^2 + x_3^2$ as rational function of the elementary symmetic functions.

Roll No. ..... Total Pages : 03

MDE/D-17 4338

REAL ANALYSIS-I

MM-402

ime : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section. and the compulsory question. All questions carry equal marks.

Section I

1. (a) If f is continuous on $[a, b]$, show that $f \in R(\alpha)$ on $[a, b]$.

(b) Suppose $f \in R(\alpha)$ on $[a, b]$, $m \in f \in M$, ϕ is continuous on $[m, M]$ and $h(x) = \phi(f(x))$ on $[a, b]$. Show that $h \in R(\alpha)$ on $[a, b]$.

2. (a) Suppose α increases monotonically and $\alpha' \in R$ on $[a, b]$. Let f be a bounded real function on $[a, b]$. Show that $f \in R(\alpha)$ iff $f\alpha' \in R$. In that case :

$$\int_a^b f d\alpha = \int_a^b f(x)\alpha'(x)dx$$

(b) If r' is continuous on $[a, b]$ show that r is rectifiable, and $\Lambda(r) = \int_a^b |r'|(t)\, dt$. **8**

Section II

3. (a) State and prove Cauchy Criterion for uniform convergence. **6**

   (b) Does there exists a real continuous function on the real line which is nowhere differentiable ? Justify your answer. **10**

4. State and prove Weierstrass approximation theorem. **16**

Section III

5. State and prove the inverse function theorem. **16**

6. (a) Suppose f maps a convex open sets $E \subset \mathbf{R}^n$ into $\mathbf{R}^m$, f is differentiable in E, and there is a real number M such that $\|f'(x)\| \leq M$ for every $x \in E$, show that : **8**

$$\|f(b)-f(a)\| \leq M\|b-a\|$$

   for all $a \in E$, $b \in E$.

   (b) State and prove the contraction principle. **8**

Section IV

7. (a) State and prove Taylor's theorem. **8**

   (b) State and prove Parseval's theorem. **8**

8. If ψ is a k-chain of class e^n in an open set $V \subset \mathbf{R}^m$ and if W is a $(k-1)$-form of class e' in V, show that : 16

$$\int_{\psi} dw = \int_{\partial\psi} w$$

Compulsory Question

9. (a) Suppose f is a bounded real function on and $f^2 \in R$ on $[a, b]$. Does it follow that $f \in R$? Justify.

   (b) State (only) the fundamental theorem of integral calculus.

   (c) State (only) Weierstrass M-test.

   (d) Let $\{f_n\}$ be defined by :

$$f_n(x) = \frac{x^2}{x^2 + (1-nx)^2} \left(0 \leq x \leq 1, n \in \mathbf{N}\right)$$

   Is this sequence equicontinuous ?

   (e) State (only) implicit function theorem.

   (f) If $A \in L(\mathbf{R}^n, \mathbf{R}^m)$ and if $x \in \mathbf{R}^n$, show that $A'(x) = A$.

   (g) State (only) Stirling's formula.

   (h) State (only) Abel's theorem. **8×2=16**

Roll No. .....

Total Pages : 03

MDE/D-17

4339

MATHEMATICS

MM-403

Topology

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section. All questions carry equal marks.

Section I

1. (a) Prove that the interior of a subset of a topological space X is the largest open set contained in the set.

(b) Let X be a non-empty set and C : P(X) -> P(X) be such that $C(\phi) = \phi$ and $A \subseteq C(A)$, $C(C(A) = C(A)$ $\forall\ A \in P(X)$. Prove that of $C(A \cup B) = C(A) \cup C(B)$ $\forall\ A, B \in P(X)$, then $\exists$ a unique topology on X such that $C(A) = \bar{A}$.

2. (a) Prove that in a second axiom space every collection of non-empty mutually disjoint open sets is countable.

(b) Prove that subspace of a separable space need not be separable.

Section II

3. (a) Prove that the map $f : (X, f) \to (Y, f')$ is continuous iff $f(\bar{A}) \subseteq \overline{f(A)}$ $\forall$ $A \subseteq X$.

(b) State and prove productive property of Hausdorff spaces.

4. (a) Let A be a subset of a T_1-space. Prove that if $x \in X$ is a limit of A, then every *xbd* of x contains infinitely many points of A.

(b) Prove that subspace of a regular space is regular.

Section III

5. (a) Prove that a topological space X is normal iff every *nbd* of each closed set contains a closed *nbd.* of the closed set.

(b) State and prove Embedding theorem.

6. (a) Let C be a collection of subsets of a Set X, having f.i.p. Prove that there is a filter on X containing C.

(b) Prove that a topological space X is T_2 iff every convergent filter on it has a unique limit.

Section IV

7. (a) Prove that a compact subset of a Hausdorff space is closed.

(b) Prove that every compact T_2-space is normal.

8. (a) Prove that a compact T_2-space is regular.

(b) Prove that product of compact topological spaces is compact.

Section V

9. (a) Let A and B be subsets of a topological space X. Prove that $\overline{A \cup B} = \bar{A} \cup \bar{B}$.

(b) Prove that of A is a subset of a topology space X, then $X - \bar{A} = (X - A)^\circ$.

(c) Prove that projection maps are open maps.

(d) Prove that a substance of a T_1-space is T_1.

(e) Prove that every completely regular space is regular.

(f) Give an example of an ultra filter on a set X.

(g) Give an example of a space which is not T_2.

(h) Let f be a cofinite topology on a set X. Prove that (X, f) is compact.

(b) Apply the calculus of residue to prove that :

$$\int_0^\infty \frac{dx}{1+x^2} = \frac{\pi}{2}$$

9. Prove that :

$$\int_0^\infty \frac{x^a}{1+x^2} dx = \frac{\pi}{2} \sec \frac{\pi a}{2} \quad (-1 < 0 < 1)$$

Roll No. ..... Total Pages : 04

MDE/D-17 4340

COMPLEX ANALYSIS-I

MM-404

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. 1 is compulsory. All questions carry equal marks.

(Compulsory Question)

1. (i) Find the radius of convergence of the power series $\Sigma \frac{z^n}{n!}$.

(ii) Define piecewise smooth path.

(iii) State Cauchy's inequality.

(iv) Define winding number of a closed curve with simple properties.

(v) Find the singularity of the function $f(z) = \sin \frac{1}{z}$.

(vi) Define mermorphism function.

(vii) Find the residue of $\frac{1}{\left(z^2+G^2\right)^2}$ at $z = ia$.

(viii) Define residue at infinity.

Section I

2. (a) Show that the sum function $f(z)$ of the power series $\sum_{n=0}^{\infty} a_n z^n$ represents an analytic function inside its circle of convergence.

(b) Define the exponential function with its properties.

3. (a) Define complex line integral. Prove that $\left|\int_L f(z)dz\right| \le \int_L |f(z)||dz|$. Also evaluate $\int_L |dz|$ where L is any rectifiable are joining the points $z = \alpha$ and $z = \beta$.

(b) Define bounded variation and simply connected domain. Also state and prove Gaoursat Lemma.

Section II

4. State and prove Cauchy integral formula for higher order derivative. Also write to evaluate $\int_C \frac{e^{2z}}{(z+1)^4}$ where C is the circle $|z| = 3$.

5. (a) State and **prove converse** of Cauchy integral theorem.

(b) State and prove Taylor's theorem.

Section III

6. (a) State and prove minimum modulus principle.

(b) State and prove Carrorati Weierstrass theorem.

7. (a) State Rouche's theorem and use it to show that the equation $z^5 + 15z + 1 = 0$ her one root in the disc $|z| < \frac{3}{2}$ and four roots in the annulus $\frac{3}{2} < |z| < 2$.

(b) State and prove inverse function theorem.

Section IV

8. (a) Show that :

$$\int_0^{2\pi} \frac{d\theta}{2+\cos\theta} = \frac{2\pi}{\sqrt{3}}$$

(b) If $\phi_i \in C^n$ on I for each $i = 1, 2, \ldots, n$ and $W(\phi_1, \phi_2, \ldots \phi_n)(t) \neq 0$ on I, then prove that, $\exists$ a unique normalized homogenous differential equation of order n for which these functions form a fundamental set. **8**

7. (a) State and prove Abel's identity. **10**

(b) Solve :

$$x'' - 2tx' + 2x = 0$$

by reduction of order. **6**

Section IV

8. (a) Prove that the initial value problem :

$$\frac{d^n x}{dt^n} = f\left(t, \frac{dx}{dt}, \frac{d^2x}{dx^2}, \ldots, \frac{d^{n-1}x}{dt^{n-1}}\right)$$

$$x(\tau) = \xi_1,\ x'(\tau) = \xi_2, \ldots, x^{(n-1)}(\tau) = \xi_n$$

is equivalent to a system of n. O.D.E's each of order one together with n initial conditions. **8**

(b) State and prove Osgood theorem. **8**

9. Show that a solution of an initial value problem depends upon the initial conditions and parameters. Further prove that the solution is a continuous function of independent variable, initial conditions and parameters. State the conditions yourself which are required to prove the above. **16**

Roll No. ..... **Total Pages : 04**

MDE/D-17 **4341**

MATHEMATICS

MM-405

Differential Equations-I

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory. Attempt at least *one* question from each Section.

1. (a) Define ε-approximate solution of a differential equation and give one example. **2**

(b) Find the differential system for which the vector $\begin{pmatrix} te^{3t} \\ \left(t - \frac{1}{2}\right)e^{3t} \end{pmatrix}$ is a solution. **2**

(c) Find second approximate solution of $x'(t) = 1 - tx$, $x(0) = q$. **2**

(d) State Kneser's theorem. **2**

(e) Using Lagrange's identify, prove Green's formula. **2**

(f) Give an example of functions whose Wronskian is zero and the function are linearly dependent over some interval. **2**

(g) Construct an example to show that a third order differential equation is equivalent to a system of three first order differential equations. **2**

(h) What is the difference between maximal solution and maximal interval of existence of a differential equation ? **2**

Section I

2. State and prove Picard Lindelöff theorem. **16**

3. (a) Prove that solving a given initial value problem is equivalent to solution of an integral equation. **6**

(b) Prove that solution of a initial value problem can be continued to be left or right of interval of existence. **10**

Section II

4. (a) If $\phi(t)$, $t \in I$, is a fundamental matrix of the system $x'(t) = Ax$, A is a constant matrix, such that $\Phi(0) = E$, E being an identity matrix, then prove that :

$$\Phi(t + s) = \Phi(t)\Phi(s), \quad t \text{ and } s \in I. \quad \mathbf{6}$$

(b) Determine e^{tA} and a fundamental matrix for the system $x'(t) = Ax$, where : **10**

$$A = \begin{bmatrix} 2 & 0 & 0 \\ 3 & 0 & 3 \\ 4 & 3 & 0 \end{bmatrix}$$

5. (a) Describe Floquet theory. **8**

(b) Prove that :

$$\Phi(t) = \Phi_n(t) + \Phi(t)\int_z^t \Phi^{-1}(s)b(s)\,ds, t \in I,$$

where the symbols have usual meaning. **8**

Section III

6. (a) If $\lambda_1, \lambda_2, \ldots\ldots\lambda_m$ are distinct roots of the characteristics equation :

$$\lambda^n + a_1\lambda^{n-1} + \ldots\ldots + a_n = 0,$$

λ_i has multiplicity r_i ($i = 1, 2, \ldots\ldots, m$), then prove that fundamental set for $L_n x = 0$ is given by :

$$t^k e^{t\lambda i} \quad (K = 0, 1, \ldots, r_i - 1; \; i = 1, 2, \ldots, m)$$

8

Roll No. ..... Total Pages : 3

MDQ/D-17 **4229-S**

MATHEMATICS

(Partial Differential Equations and Mechanics)

Paper : MM-501

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all, selecting at least *one* question from each Section. All questions carry equal marks.

SECTION–I

1. (a) Find the equation of the integral surface of the differential equation

$$2y(z - 3)\, p + (2x - z)\, q = y\,(2x - 3)$$

which passes through the circle $z = 0$, $x^2 + y^2 = 2x$.

(b) Show that the equation $xp = yq$, $z(xp + yq) = 2xy$ are compatible and solve them.

2. (a) If $u \in C^2(U)$ is harmonic, then prove that

$$u(x) = \int_{\partial B(x,r)} u\,ds = \int_{B(x,r)} u\,dy$$

for each ball $B(x, r)$ CU.

(b) State and prove Liouville's Theorem.

SECTION–II

3. Solve $u_{tt} - \Delta u = 0$ in $R^n \times (0, \infty)$ with $\left.\begin{matrix} u = g \\ u_t = h \end{matrix}\right\}$ on $\begin{matrix} R^n \times (t = 0) \\ n = 3 \end{matrix}$.

4. (a) Find the Complete integral of

$$u_t + H(DU) = 0 \text{ in } R^n \times (0, \infty)$$

where $H : R^n \to R$ is the Hamiltonian : $t > 0$.

(b) Solve $u_t + \frac{1}{2}|Du|^2 = 0$ in $R^n \times (0, \infty)$

$$u = |x| \text{ on } R^n \times (t = 0).$$

5. Use the Laplace transform method to solve

$u_{tt} - \Delta u = 0$ in $R^n \times (0, \infty)$

$u = g$, $u_t = 0$ on $R^n \times (t = 0)$

where n is odd and g is smooth with compact support.

SECTION–III

6. State and prove Brachistochrone problem.

7. (a) Test for extremal the functional

$$J[y, z] = \int_0^1 (y'^2 + z'^2 + 4z)\, dx$$

when $y(0) = 0$, $y(1) = 1$, $z(0) = 0$, $z(1) = 0$.

(b) Find the shortest distance between the points A(1, –1, 0) and (2, 1, –1) lying on the surface $15x - 7y + z - 22 = 0$.

SECTION–IV

8. (a) Define generalized coordinates. Derive Lagrange's equation of first kind.

(b) Obtain general expression for variation of total energy of the system. In what case the total energy is constant.

9. (a) Derive Hamilton's Canonical equations of motion.

(b) Define Poisson's bracket of two-dimensional variables and prove that the Jacobi–Poisson's theorem.

10. (a) State and prove Jacobi's Theorem.

(b) Define Lagrange's bracket and find the necessary and sufficient condition of a transformation to be a canonical transformation in terms of Lagrange's bracket.

Roll No. ..... Total Pages : 03

MDQ/D-17 **4230-S**

MATHEMATICS

MM-502

Discrete Mathematics & Computer Programming

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Section I

1. (a) Prove that the lattice of all normal subgroup of a group G is modular. **8**

(b) Let L be a modular lattice. Prove that the elements of $a_1, a_2, ..., a_n \in L$ are independent iff

$$l(a_1 \vee a_2 \vee ..... \vee a_n) = \sum_{j=1}^{n} l(a_j).$$ **8**

2. (a) Prove that $D_n = \{m \in \mathbf{N} | m \text{ devides } n\}$ is a boolean algebra iff n is the product of distinct primes ($n > 1$). **8**

(b) Let B be a finite Boolean algebra. Prove that $B \cong P(X)$, for some non-empty set X. **8**

Section II

3. (a) Prove that a connected graph G is an Euler graph iff G is the union of edge-disjoint circuits. **8**

(b) Prove that a tree of n vertices has $n-1$ edges. **8**

4. (a) Prove that the number of common edges between a circuit and a cut-set in a connected graph is always even. **8**

(b) Prove that the dimension of cut-set subspace of the vector space W_G, of a connected graph G is the rank of G. **8**

5. (a) Prove that the rank of a circuit matrix of a connected graph G is the nullity of G. **8**

(b) Let P_1 and P_2 be two different paths between vertices x and y of a graph G. Prove that $P_1 \oplus P_2$ contains a circuit. **8**

Section III

6. (a) Prepare a list of C operators, in the descending order of their precedence in expressions. **8**

(b) Explain, with examples, the working of various mathematical functions available in C library. **8**

7. Discuss the statements used for branching (if, nested if, switch) in C. Explain each with an example.

Section IV

8. (a) Explain the declaration and initialization of two-dimensional arrays. **4**

(b) Write a C-program that calculates the product of two given matrices. **12**

9. (a) Explain, with example, the anatomy of a user-defined C function. **8**

(b) Write C-program to compute the powers of 2, from 2 to 11, using a user-defined function. **8**

10. Write short notes on the following :

(a) strcmp( ) function

(b) Structure

(c) Characters *vs.* integers

(d) Pointer arithmetic. **4×4**

Section IV

9. (a) Find the solution using Laplace transform : 8

$$f(s) = \int_0^S K\left(s^2 - t^2\right) g(t)dt,\ S > 0$$

(b) Discuss the finite Hilbert transform and derive its second-form. 8

10. What is Generalized three-part boundary value problem ? Find its solution. 16

Roll No. ..... Total Pages : 04

MDQ/D-17 **4235-S**

MATHEMATICS

Paper : X

MM-505 Opt. (i)

Integral Equations and Boundary Value Problems

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section.

Section I

1. Define with examples : 8

(a) (i) Separable kernel

(ii) Eigen values and Eigen functions

(iii) Convolution integral

(iv) The inner product of two functions.

(b) Prove that the homogeneous equation $g(s) = \lambda \int K(s,\ t)\, g(t)\, dt$ possesses a finite number 'r' of linearly independent solutions gio. 8

2. (a) Discuss the iterative scheme for the solution of the second kind Fredholm integral equation : 8

$$g(s) = f(z) + \lambda \int_a^b K(s, t)\, g(t)\, dt$$

(b) Solve the integral equation :

$$g(s) = f(s) + \lambda \int_0^1 e^{s-t}\, g(t)\, dt$$

by successive approximation method. 8

3. Prove that : 8

(a) $\Gamma(s, t; \lambda) = K_1(s, t)$

$$+ \sum_{m=2}^{\infty} \lambda^{m-1} \int K_{m-1}(s, x) K(x, t) dx$$

(b) $\frac{\partial}{\partial \lambda} \Gamma(s, t; \lambda) = \int \Gamma(s, x; \lambda) \Gamma(s, t; \lambda)\, dx$. 8

Section II

4. State and prove Hilbert Schemidt theorem. 16

5. (a) Solve the Abel integral equation : 8

$$f(s) = \int_0^S \frac{g(t)}{\left[(s-t)^{\alpha}\right]} dt,\ 0 < \alpha < 1$$

(b) Solve the integral equation of the second kind :

$$ag(s) = f(s) - \frac{b}{2\pi} * \int_0^{2\pi} g(t) \cot\left(\frac{t-s}{2}\right) dt$$

where a and b are complex constants. 8

Section III

6. (a) Formulate the initial value problem :

$$\frac{d}{dS}\left(P(S)\frac{dy}{dS}\right) + qy(S) = F(S)$$

$y(a) = 0,\ y'(a) = 0$

into an integral equation. 10

(b) Given the initial value problem :

$$y''(S) + \lambda y(S) = F(S)$$

$y(0) = 1,\ y'(0) = 0$

Integrating twice find a volterra integral equation. 6

7. (a) Find the Green's function for the equation : 8

$$y'' + \lambda y = 0$$

$y(0) = 0,\ y'(1) + r_2\, y(1) = 0$

(b) Formulate the exterior Dirichlet problem and solve it. 8

8. Derive the Poisson integral formula. 16

Roll No. ..... Total Pages : 02

MM-2/D-17 5092

MATHEMATICS

MM-501

Functional Analysis

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Section and the compulsory question.

Section I

1. (a) Show that the space l^p $(p \geq 1)$ is a Banach space with norm given by $\|x\| = \left(\sum_{i=1}^{\infty} |\xi_i|^p \right)^{1/p}$, $x = (\xi_i) \in l^p$. 8

   (b) Show that on a finite dimensional space any *two* norms and equivalent.

2. (a) If Y is a Banach space, show that B(X, Y) is a Banach space.

   (b) Show that the dual space of the sapce C_0 is l'.

Section II

3. State and prove Riesz representation theorem for bounded linear functionals on $C[a, b]$. **16**

4. (a) If the dual space X' of a normed space X is separable, show that X itself is separable. 6

   (b) Show that there exists real valued continuous functions whose Fourier series diverge at a given point t_0. 10

Section III

5. State and prove open mapping theorem giving full details. **16**

6. (a) Show that a subspace Y of a Hilbert space H is closed in H if and only if $Y = Y^{\perp\perp}$. 8

   (b) Show that the space l^p $(p \geq 1)$ is not an inner product space, hence not a Hilbert space. **8**

Section IV

7. (a) State and prove Bessel's inequality.

   (b) Show that every Hilbert space is reflexive.

8. (a) Show that a bounded linear operator T on a complex Hilbert space H is unitary if and only if T is isometric and surjective.

   (b) Show that a bounded linear operator $P : H \to H$ on a Hilbert space H is a projection if and only if P is self-adjoint and idempotent.

Compulsory Question

9. (a) What do you mean by a schander basis ? Which is the schander basis of l^p $(p \geq 1)$?

   (b) Give an example of :

   (i) a seminorm which is not a norm

   (ii) a functional which is not linear.

   (c) If $f(x) = f(y)$ for every bounded linear functional f on a normed space X, show that $x = y$.

   (d) Is l^1 reflexive ? Justify.

   (e) Give an example of a sequence which is weakly convergent but not strongly convergent.

   (f) Show that the annihilator $M^{\perp}$ of a set $M \neq \phi$ in an inner product space X is a closed subspace of X.

   (g) Show that if $T : H \to H$ is a bounded self-adjoint linear operator, so is T^n, where n is a positive integer.

   (h) Give an example to show that the sum of two projections need not be a projection. **8×2=16**

(b) Obtain the condition of canonicity of the transformation in terms of Poisson brackets. 8

Compulsory Question

9. (i) Find the extremal of the function $I = \int_{x_1}^{x_2} \sqrt{1+y'^2}\,dx$. 2

(ii) Find the extremal of the functional :

$$I[y(x)] = \int_0^1 \left(\frac{y'^2}{2} + yy' + y' + y \right) dx$$

using natural boundary conditions. 2

(iii) Show that the functional :

$$I[y(x)] = \int_{x_1}^{x_2} F(x, y, y')\,dx$$

is stationary if $\Delta I = 0$. 2

(iv) What is degree of freedom 2

(v) Prove that : 2

$$\frac{d}{dt}\left(\frac{\partial T}{\partial \dot{q}_j}\right) = \frac{\partial T}{\partial q_j} = \frac{\partial}{\partial q_j}\left(\frac{\partial L}{\partial \dot{q}_j}\right)$$

(vi) Prove that if f and g are integrals of the equation of motion, then Poisson bracket of f, g i.e. (fg) is also an integral of equation of motion. 2

(vii) Prove that for straight path $\delta W = 0$. 2

(viii) Define a canonical transformation. 2

Roll No. ..... Total Pages : 04

MDQ/D-17 5093

ANALYTICAL MECHANICS AND CALCULUS OF VARIATIONS

MM-502

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section and the compulsory question.

Section I

1. (a) Prove that the shortest distance between the two points $A(a_1, b_1)$ and $B(a_2, b_2)$ is a straight line. 8

(b) Determine the stationary function $y(x)$ for the problem :

$$\delta\left[\int_0^1 (y')^2\,dx + (y(1))^2\right] = 0$$

with $y(0) = 1$.

2. (a) Find the Euler's equation for the functionals depending upon 'n' dependent variables.

(b) Find the geodesic on the surface of sphere of radius R. 8

Section II

3. (a) Derive the relations :

(i) $Q_j = -\frac{\partial V}{\partial q_j}$

(ii) $Q_j = \frac{d}{dt}\left(\frac{\partial T}{\partial \dot{q}_j}\right) - \frac{\partial T}{\partial \dot{q}_j}$ 8

(b) Derive Lagrange's equation of motions of a double pendulum in a vertical plane. 8

4. (a) Prove that the form of equilibrium of a heavy homogeneous chain attached at two points is a catenary. 8

(b) Prove that for a conservative system $\frac{dE}{dt} = 0$. 8

Section III

5. (a) State and prove Donkin's theorem and prove that the generalized total energy is given by :

$$H(q_i, p_i) = \text{constant} = h$$

(b) For any functions $\phi(t, q_i, p_i)$, $\psi(t, q_i, p_i)$, $\chi(t, q_i, p_i)$, prove the following :

(i) $(\phi\psi) = -(\psi\phi)$

(ii) $(c\phi\psi) = C(\phi\psi)$. C is a constant

(iii) $((\phi + \psi)\chi) = (\phi\chi) + (\psi\chi)$

(iv) $((\phi\psi)\chi) + ((\psi\chi)\phi) + ((\chi\phi)\psi) = 0$

(v) $\frac{\partial}{\partial t}(\phi\psi) = \left(\frac{\partial \phi}{\partial t}\psi\right) + \left(\phi\frac{\partial \psi}{\partial t}\right)$

where $(\phi\psi)$ represent the Poisson bracket.

6. (a) State and prove the second form of Hamilton's principle. 8

(b) Derive Lagrange principle of least action. 8

Section IV

7. (a) Prove that :

$$\tilde{q} = \sqrt{q}\cos 2p$$
$$\tilde{p} = \sqrt{q}\sin 2p$$

is a free univalent canonical transformation.

(b) Discuss the simplicial nature of the Jacobian matrix of a canonical transformation and prove that simplicial matrices are non singular. 8

8. (a) Explain the method of separation of variables for finding a complete solution to the Hamilton-Jacobi equation. 8

Roll No. ..... Total Pages : 03

MDQ/D-17 5094

ELASTICITY

MM-503 Opt. (i)

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *one* question from each of the Section I to IV. Section V is compulsory. All questions carry equal marks.

Section I

1. Define and explain with examples the following terms as used in tensor analysis : 4×4
   (a) tensor transformation
   (b) covariant and contravariant tensors
   (c) order of a tensor
   (d) symmetric and skew-symmetric tensor.

2. (a) Define substitution tensor and alternating tensor and verify each as a tensor. Use these tensors to represent scalar product and vector product of two tensors. 8

   (b) Define the invariants of a tensor of order 2 and verfiy their invariance. 8

Section II

3. Define strain tensor and discuss the geometrical interpretation of its components. **16**

4. Derive equations of compatibility for an elastic body. Explain their need and physical significance. **16**

Section III

5. Discuss the existence of principal directions of stress. Express the stress components in terms of principal stresses. Define normal stress and shearing stress at a point. **16**

6. (a) Show that the greatest principal stress—the least principal stress = 2 × the maxumum shearing stress. **8**

   (b) Write a note on stress quadric of Cauchy. **8**

Section IV

7. Define the characteristics of a homogeneous istropic elastic medium. For such a medium, explain the terms : **4×4**

   (a) Simple tension

   (b) Hydro-static pressure

   (c) Young's modulus

   (d) Poisson's ratio.

8. Derive Beltrami-Mitchell compatibility equations for isotropic elastic body. Explain changes with the kinds of body force. **16**

Section V

9. (a) Define deviatoric tensor.

   (b) Explain Cayley-Hamilton theorem for tensors.

   (c) Discuss the relation between stress vector and stress tensor.

   (d) Use an example to explain the state of hydrostatic stress in an elastic medium.

   (e) What is the difference between Eulerian strain components and Lagrangian strain components ?

   (f) Discuss the number of coefficients required to specify the general anisotropy of an elastic medium.

   (g) Write stress-strain relations for an orthotropic medium

   (h) Define Saint-Venant principle. **8×2**

(b) Determine the three stress invariants for the stress tensor : 4

$$\begin{pmatrix} 6 & -3 & 0 \\ -3 & 6 & 0 \\ 0 & 0 & 8 \end{pmatrix}$$

Section IV

8. (a) Describe Hagen-Poiseuille flow. **8**

(b) Determine the maximum value of the velocity profile in the annular space between two coaxial cylinders. **8**

9. (a) Explain steady viscous flow in a tube having equilateral triangular cross-section. **8**

(b) State and prove uniqueness theorem for steady viscous flow. **8**

Roll No. ..... **Total Pages : 04**

MDQ/D-17 5098

FLUID MECHANICS-I

MM-504

Time : Three Hours] [Maximum Marks : 80

Note : Q. No. **1** is compulsory. Attempt *Five* questions in all, selecting at least *one* question from each Section and the compulsory questions.

1. (a) State the principle on which equation of continuity is based upon.

(b) What is the relation between the potential flow and the vorticity vector ? Justify your answer.

(c) What is the difference between stream lines and path lines ?

(d) For given fluid particle velocity :

$$\vec{q} = \hat{i}\left(Ax^2yt\right) + \hat{j}\left(By^2zt\right) + \hat{k}\left(Czt^2\right)$$

determine the vorticity vector.

(e) Given stress tensor as :

$$\begin{pmatrix} 7 & 0 & -2 \\ 0 & 5 & 0 \\ -2 & 0 & 4 \end{pmatrix}$$

at a point P. Determine stress vector on a plane at P whose d.cs. are $\left\langle \frac{2}{3}, \frac{-2}{3}, \frac{1}{3} \right\rangle$.

(f) Explain steady flow. 2

(g) Velocity components are given as : 2

$$u = y\frac{U}{h} + \frac{h^2}{2\mu}\left(-\frac{dp}{dx}\right)\frac{y}{h}\left(1 - \frac{y}{h}\right), v = w = 0$$

where U, h, $\frac{dp}{dx}$ and μ are constants. Show that :

$$(\vec{q}.\nabla)\vec{q} = \vec{o}$$ 2

(h) Define Poiseuille flow. 2

Section I

2. (a) Derive equation of continuity. **8**

(b) Show that in a two dimensional incompressible steady flow field with velocity components : **8**

$$u = \frac{k\left(x^2 - y^2\right)}{\left(x^2 + y^2\right)^2}, v = \frac{2kxy}{\left(x^2 + y^2\right)^2},$$

the equation of continuity is satisfied.

3. Describe general analysis of fluid motion. **16**

Section II

4. (a) Derive Lagrange's equations of motion. **8**

(b) A quantity of liquid occupies a length $2l$ of a straight tube of uniform small bore under the action of a force to a point in the tube varying as a distance from that point. Determine the pressure at a point. **8**

5. (a) Prove that the mean value of ϕ over any spherical surface, through out whose interior $\nabla^2\phi = 0$, is equal to the value of ϕ at the centre of the sphere. **8**

(b) State and prove Kelvin's minimum energy theorem. **8**

Section III

6. (a) Derive the equation : **8**

$$\frac{\partial\vec{q}}{\partial t} + \nabla\left(\frac{1}{2}\vec{q}^2\right) - \vec{q}\times\left(\nabla\times\vec{q}\right) =$$

$$\vec{F} - \nabla\int\frac{dp}{\rho} + \frac{4}{3}\nu\nabla\left(\nabla.\vec{q}\right).\nu\nabla\times\left(\nabla.\vec{q}\right)$$

where symbols have usual meaning.

(b) Describe steady flow through a tube of uniform circular cross-section. **8**

7. (a) Obtain relations between stress and rate of strain. **12**

(iii) If λ_1 is the smallest eigen value of the symmetric L_2-kernel $k(s, t)$ then : 2

$$\frac{1}{|\lambda_1|} = \max(k\phi, \phi), \|\phi\| = 1$$

(iv) Give the necessary and sufficient condition for the existence of a solution of the equation :

$$g(s) = f(s) + \lambda \int_a^b k(s,t)\, g(t) dt$$ 2

(v) Prove that :

$$\frac{\partial}{\partial \lambda} \Gamma(s, t; \lambda) = \int \Gamma(s, x; \lambda) \Gamma(x, t; \lambda)\, dx$$

(vi) Prove that : 2

$$k_m(s,t) = \int k_r(s, x) k_{m-r}(x, t)\, dx$$

(vii) Invert the equation : 2

$$g(s) = f(s) + \lambda \int_0^{2\pi} (\sin s \cos t)\, g(t) dt$$

(viii) Define the convolution integral. 2

Roll No. ..... Total Pages : 04

MDQ/D-17 5102

INTEGRAL EQUATIONS

MM-505 (i)

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section including the compulsory question.

Section I

1. (a) Explain the method of reduction to a system of algebraic equations. 8

(b) Solve the integral, equation :

$$g(s) = f(s) + \lambda \int_0^1 (s + t)\, g(t)\, dt$$

and find the eigen values. 8

2. (a) Show that the integral equation :

$$g(s) = \lambda \int_0^{\pi} (\sin s \sin 2t)\, g(t)\, dt$$

has no eigen values. 8

(b) Define a linear integral equation and explain its classification in detail. 8

Section II

3. (a) Discuss the iterative-scheme for the solution of linear integral equations of the second kind : **8**

$$g(s) = f(s) + \lambda \int_a^b k(s,t)\, g(t)\, dt$$

(b) Find the resolvent kernel for : **8**

$$g(s) = f(s) + \lambda \int_0^s e^{s-t} g(t)\, dt$$

4. State and prove Fredholm's second theorem in its classification form. **16**

Section III

5. (a) Show that the eigen functions of a symmetric kernel, corresponding to different eigen values are orthogonal. **8**

(b) Prove that a nonnull, symmetric L_2-kernel K is non-negative iff all its eigen values are positive. **8**

6. State and prove Hilbert-Schmidt theorem and hence prove that : **12+4**

$$K_m(s,t) = \sum_{k=1}^{\infty} \lambda^{-m} k\, \phi k(s)\, \phi_k^*(t)$$

Section IV

7. (a) Solve the singular integral equation :

$$f(s) = \int_s^b \frac{g(t)\, dt}{[h(t) - h(s)]^{\alpha}}, \; 0 < \alpha < 1$$

where $h(t)$ is monotonically including function **8**

(b) Find a solution of the integral equation : **8**

$$S^2 = \int_s^4 \frac{g(t)\, dt}{\left(t^2 - s^2\right)^{1/3}}, \; 2 < s < 4$$

8. (a) Prove that if $f(s)$ is Hölder continuous then the singular integral : **8**

$$* \int_a^b \frac{f(t)}{(t-s)} dt \text{ exists.}$$

(b) Prove the relation : **8**

$$\frac{1}{4} g(t) = \frac{1}{(2\pi i)^2} \int_L^* \frac{d\tau_1}{(\tau_1 - t)} \int_L^* \frac{d(\tau)}{(\tau - \tau_1)} d\tau$$

Compulsory Question

9. (i) Define the Cauchy Principal value. **2**

(ii) Show that : **2**

$$\|k\| \le \left[\iint |k(s,t)|^2 \, ds\, dt \right]^{1/2}$$

Roll No. ..... Total Pages : 03

MDE/D-17 4411

ORGANISATIONAL BEHAVIOUR

MC-101

Time : Three Hours] [Maximum Marks : 80

Note : Q. No. **1** is compulsory. Attempt *Four* questions out of remaining seven questions and each such question carries 14 marks.

प्रश्न संख्या 1 अनिवार्य है । शेष सात प्रश्नों में से चार प्रश्न कीजिए और प्रत्येक प्रश्न 14 अंकों का है ।

Compulsory Question

(अनिवार्य प्रश्न)

1. Answer to following questions should not exceed 150 words. Each question carreis 4 marks.

(a) Describe features of Scientific Management

(b) Systems approach to Organisational Behaviour

(c) 'Locus of Control' as a predictor of organisational behaviour

(d) Halo effect

(e) Child ego

(f) Suggest measures for increasing Group Cohesiveness. 6×4=24

प्रत्येक प्रश्न **150** शब्दों से अधिक में नहीं होना चाहिए । प्रत्येक प्रश्न 4 अंकों का है :

(अ) वैज्ञानिक प्रबन्ध की विशेषताएँ बताइए ।

(ब) संगठनात्मक व्यवहार के पद्धति उपागम

(स) 'लोकस ऑफ कंट्रोल' संगठनात्मक व्यवहार के अग्रदूत के रूप में

(द) हैलो प्रभाव

(इ) बाल अहम्

(फ) ग्रुप सामंजस्य को बढ़ाने के लिए उपाय सुझाइए ।

2. Explain the different approaches to Organisational Behaviour. **14**

संगठनात्मक व्यवहार के लिए विभिन्न उपागमों का वर्णन कीजिए ।

3. Define Personality. What are its major determinants ? Why do Type B personality people hire to senior positions rather than Type A ? **14**

व्यक्तित्व की परिभाषा दीजिए । इसके प्रमुख निर्धारक तत्त्व क्या हैं ? टाइप B प्रकार के लोग टाइप A की अपेक्षा वरिष्ठ पदों पर क्यों काम करते हैं ?

4. Explain the various internal and external factors influencing perception. Also describe the importance of perception in understanding organisational behaviour. **14**

धारणा को प्रभावित करने वाले विभिन्न आन्तरिक और बाह्य कारकों को समझाइए । संगठनात्मक व्यवहार को समझने में धारणा का महत्त्व बताइए ।

5. Explain the Classical conditioning, Operant conditioning and Social learning theories of learning. **14**

अधिगम की परम्परागत दशायें, ऑपरेन्ट दशायें तथा सामाजिक अधिगम सिद्धान्तों का वर्णन कीजिए ।

6. Explain the meaning and features of Group Dynamics. Also explain different types of groups. **14**

समूह गतिकी का अर्थ तथा लक्षणों का वर्णन कीजिए । समूह के विभिन्न प्रकारों का वर्णन कीजिए ।

7. What is Transactional Analysis ? Explain various ego states and also discuss the various types of transactions between two persons. **14**

लेनदेन विश्लेषण क्या है ? विभिन्न अहम् दशाओं का वर्णन कीजिए और दो व्यक्तियों में विभिन्न प्रकार के लेनदेनों का वर्णन कीजिए ।

8. Write notes on the following : **7+7**

(a) Consequences of Group Cohesiveness

(b) Explain the various types of 'Strokes' and their relevance.

निम्नलिखित पर टिप्पणियाँ लिखिए :

(अ) समूह सामंजस्य के परिणाम

(ब) 'स्ट्रोक्स' के विभिन्न प्रकारों तथा उनकी प्रासंगिकता का वर्णन कीजिए ।

Roll No. .....

Total Pages : 03

MDE/D-17

4412

BUSINESS ENVIRONMENT

MC-102

Time : Three Hours]

[Maximum Marks : 80

Note : Q. No. **1** is compulsory. Attempt any *four* questions out of remaining seven questions.

प्रश्न संख्या **1** अनिवार्य है । शेष सात प्रश्नों में से कोई **चार** प्रश्न और कीजिए ।

1. Write short notes on the following :

(i) Industrial Sickness

(ii) Industrial Licensing Policy

(iii) Corporate Governance

(iv) Business Ethics

(v) Social Responsibility of Business

(vi) Environmental Scanning.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(i) औद्योगिक बीमारी

(ii) औद्योगिक लाइसेंसिंग नीति

(iii) कॉर्पोरेट गवर्नेंस

(iv) व्यापार आधार संहिता

(v) व्यापार का सामाजिक उत्तरदायित्व

(vi) पर्यावरणीय स्कैनिंग

2. Explain the main provisions of the Environment (Protection) Act.
पर्यावरण (संरक्षण) अधिनियम के प्रमुख प्रावधानों का वर्णन कीजिए ।

3. Write a detailed note on Consumer Protection Act.
उपभोक्ता संरक्षण अधिनियम पर विस्तृत नोट लिखिए ।

4. Explain the Interaction matrix of different environment factors with example.
विभिन्न पर्यावरण कारकों के अन्तर्क्रिया आव्यूह का सोदाहरण वर्णन कीजिए ।

5. Differentiate between Fiscal and Monetary Policy of India.
भारत की राजकोषीय तथा मौद्रिक नीति में अन्तर स्पष्ट कीजिए ।

6. Explain the main provisions of Foreign Exchange Management Act.
विदेशी विनिमय प्रबन्धन अधिनियम के प्रमुख प्रावधानों का वर्णन कीजिए ।

7. Give the highlights of latest EXIM Policy of India.
भारत की नवीनतम EXIM नीति पर प्रकाश डालिए ।

8. Write a detailed note on Competition Act.
प्रतियोगिता अधिनियम पर विस्तृत नोट लिखिए ।

Roll No. ..... Total Pages : 02

CMDE/D-17 4413

MANAGERIAL ECONOMICS

MC-103

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory and carries 4 marks each. Attempt any *four* questions out of remaining seven questions and which are of 14 marks each.

1. Write explanatory notes in **150** words each :

(i) What is the nature of Managerial Economics ?

(ii) Distinguish between autonomous demand and derived demand.

(iii) What are features of iso quant ?

(iv) What is the concept of sunk cost ?

(v) What are essential conditions for practice of Price Discrimination ?

(vi) Why Average cost initially falls, thereafter rises ?

2. Explain the concept of cross elasticity of demand. How does such elasticity differ in case of substitutes and complimentary goods ?

3. Examine the "Trend Projection" method and "Collective Opinion" method of demand forecasting.

4. Why do increasing returns to scale imply a decreasing long run average cost function and decreasing returns to scale imply increasing long run average cost functioning ?

5. Zara Ltd. produces razor and blades. Propose a pricing strategy that would allow the firm to maximize its profit on the two goods. Explain.

6. "Perfectly competitive firms and monopolists use the same rule to determine the profit maximizing the output." Elucidate.

7. What are the causes for recession in present day economy ? Suggest some measures to overcome recession.

8. Define inflation. How does inflation affect the production structure and income distribution in economy ?

Roll No. .... **Total Pages : 02**

MDE/D-17 **4414**

COMPANY LAW

MC-104

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all. Q. No. **1** consisting of six short answer questions of 4 marks each is compulsory.

कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है जिसमें छः लघु उत्तरीय जिनमें प्रत्येक प्रश्न के 4 अंक है ।

1. Short Answer Type Questions :
   - (a) Holding Company
   - (b) Object Clause
   - (c) Adoption of Table A
   - (d) Provision for issue of shares on discount
   - (e) Floating charge
   - (f) Minutes.

   लघु उत्तरीय प्रश्न :
   - (अ) होल्डिंग कम्पनी
   - (ब) ऑब्जेक्ट क्लॉज
   - (स) टेबल 'ए' को अपनाना
   - (द) छूट पर अंशों के निर्गमन के लिए प्रावधान
   - (इ) फ्लोटिंग चार्ज
   - (फ) कार्यवृत्त (मिनट) ।

2. Describe the process of incorporation of a company.
   एक कम्पनी के समावेशन की प्रक्रिया बताइए ।

3. Describe the process of alteration in name clause of the company.
   कम्पनी के नाम क्लॉज में परिवर्तन की प्रक्रिया का वर्णन कीजिए ।

4. Write a critical note on Doctrine of Ultra Vires.
   अधिकारातीत के सिद्धांत पर आलोचनात्मक लेख लिखिए ।

5. Describe important provisions for allotment of shares.
   अंशों के आबंटन के महत्त्वपूर्ण प्रावधानों का वर्णन कीजिए ।

6. Describe the powers and legal position of directors.
   निर्देशकों की शक्तियों तथा वैधानिक स्थिति का वर्णन कीजिए ।

7. Differentiate between ordinary resolution and special resolution and explain the process of passing these resolutions.
   साधारण प्रस्ताव तथा विशेष प्रस्ताव में अन्तर कीजिए तथा इन प्रस्तावों के पास होने की प्रक्रिया का वर्णन कीजिए ।

8. Describe important methods of winding up of companies.
   कम्पनियों के समापन की महत्त्वपूर्ण विधियों का वर्णन कीजिए ।

Assuming that there is no change in prices and variable costs and that the fixed expenses are incurred equally in the two half year periods, calculate for the year 2015 :

(i) The profit/volume ratio

(ii) Fixed expenses

(iii) Break-even sales

(iv) Percentage of margin of safety.

एस.वी.लि., एक बहु-उत्पाद कम्पनी ने आपको वर्ष 2015 से सम्बन्धित निम्नलिखित आँकड़े दिये हैं :

	वर्ष की प्रथम छमाही ₹	वर्ष की द्वितीय छमाही ₹
विक्रय	45,000	50,000
कुल लागत	40,000	43,000

यह मानते हुए कि दोनों छमाही में मूल्य तथा चर लागतों में किसी प्रकार का कोई परिवर्तन नहीं हुआ है, तथा स्थायी व्यय वर्ष की दोनों छमाही में बराबर खर्च हुए हैं, वर्ष 2015 के लिए गणना कीजिए :

(i) लाभ/मात्रा अनुपात

(ii) स्थाई व्यय

(iii) सम-विच्छेद विक्रय

(iv) सुरक्षा सीमांत का प्रतिशत ।

Roll No. ..... Total Pages : 04

MDE/D-17 4415

ACCOUNTING FOR MANAGERIAL DECISION

MC-105

Time : Three Hours] [Maximum Marks : 80

Note : Question paper consists of eight questions. Attempt *Five* questions in all. Q. No. 1 is compulsory. Attempt any *four* out of seven questions.

इस प्रश्न-प्रत्र में आठ प्रश्न हैं । कुल **पाँच** प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । शेष सात में से कोई **चार** प्रश्न कीजिए ।

1. Write short notes on the following :

(a) Information Report 4

(b) Expense Centre 4

(c) Labour Budget 4

(d) Material Yield Variance 4

(e) Target Costing 4

(f) Value Change Analysis. 4

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) सूचना रिपोर्ट

(ब) खर्च केन्द्र

(स) श्रम बजट

(द) सामग्री इत्तालि विचरण

(इ) लक्षित लागत

(फ) मूल्य परिवर्तन विश्लेषण ।

2. Define Management Accounting. How is it different from Financial Accounting ? **14**

प्रबन्धकीय लेखांकन की परिभाषा दीजिए । यह किस तरह वित्तीय लेखांकन से भिन्न है ?

3. Explain the importance and limitations of reporting in Business. **14**

व्यवसाय में रिपोर्टिंग के महत्त्व एवं सीमाओं का वर्णन कीजिए ।

4. Write a detailed note on Divisional Performance Evaluation. **14**

विभागीय प्रदर्शन मूल्यांकन पर एक विस्तृत लेख लिखिए ।

5. What is Price Level Accounting ? Discuss the various techniques of Price Level Accounting. **14**

मूल्य स्तर लेखांकन क्या है ? इसकी विभिन्न तकनीकों का वर्णन कीजिए ।

6. Discuss the importance and methods of preparing Cash Budget. **14**

नकदी बजट के महत्त्व एवं तैयार करने की विधियों का वर्णन कीजिए ।

7. Given the following particulars, compute the Labour variances :

Labour	Standard			Actual		
	No. of Persons	Rate (₹)	Hours	No. of Persons	Rate (₹)	Hours
Grade I	50	6	100	40	5	120
Grade II	25	10	100	30	10	120
Grade III	20	20	100	25	16	120

Standard output 200 units, Actual output 190 units. Idle Time was 2 Hours.

नीचे दिये गए विवरण से श्रम विचलन ज्ञात कीजिए :

श्रम	मानक			वास्तविक		
	श्रमिकों की संख्या	दर (₹)	घण्टे	श्रमिकों की संख्या	दर (₹)	घण्टे
श्रेणी I	50	6	100	40	5	120
श्रेणी II	25	10	100	30	10	120
श्रेणी III	20	20	100	25	16	120

मानक उत्पादन 200 इकाइयाँ, वास्तविक उत्पादन 190 इकाइयाँ, कार्यहीन समय 2 घंटे था ।

8. SV Ltd., a multi-product company, furnishes you the following data relating to the year 2015 :

	First Half of the year	Second Half of the year
	₹	₹
Sales	45,000	50,000
Total Cost	40,000	43,000

Roll No. ..... Total Pages : 02

MDE/D-17 4416

MARKETING MANAGEMENT

MC-106

Time : Three Hours] [Maximum Marks : 80

Section A

Compulsory

1. Attempt all parts :
   (i) Define Marketing Management.
   (ii) What is Direct Marketing ?
   (iii) Define Branding.
   (iv) Differentiate between Wholesaler and Retailer.
   (v) What are various elements of the Marketing Mix ?
   (vi) What is Sales Promotion ? 6×4=24

Section B

Note : Attempt any *four* questions.

2. What are various factors in the Marketing Environment which must be kept in mind while designing marketing strategies ? Elaborate with illustrations.

3. Why is it important to study Consumer Behaviour ? Identify factors influencing consumer buying behaviour.

4. What is Product Life Cycle ? Explain the various stages of PLC with the strategies adopted by marketers at each stage with examples.

5. Discuss the pricing techniques applicable to FMCG products being launched in a highly competitive market.

6. Discuss the Social and Ethical Issues in Marketing.

7. What is Distribution Channel ? Explain the pattern of channels and decisions involed in designing the various channels.

8. Write notes on the following :
   (a) Customer relationship management
   (b) Labelling and Warranty. 4×14=56

7. Differentiate between Group and a Team. Figure out the different stages of group formation process. Briefly mention the key characteristics of an effective team
समूह तथा एक टीम में अन्तर बताइए । समूह निर्माण प्रक्रियाएँ के स्तरों का अंकन कीजिए । एक प्रभावी टीम की प्रमुख विशेषताओं को संक्षेप में समझाइए ।

8. Compare and contrast the Maslow's Hierarchy of Need with Clayton Alderfer's ERG theory. Do these theories hold any relevance in present time ?
मैस्लो की पदानुक्रम आवश्यकता तथा एल्डरफर के ERG सिद्धान्त की तुलना कीजिए । क्या ये सिद्धान्त वर्तमान समय में प्रासंगिक हैं ? अपना निर्णीत उत्तर दीजिए ।

Roll No. ..... **Total Pages : 04**

MDE/D-17 4060

MANAGEMENT CONCEPTS & ORGANISATIONAL BEHAVIOUR

MC-501

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *Five* questions in all Q. No. **1** is compulsory.
कुल **पाँच** प्रश्नों के उत्तर दीजिए । प्रश्न संख्या **1** अनिवार्य है ।

1. Short Answer Type : (4 each)
   (a) Describe David McClelland's theory of needs.
   (b) Identify the relationship between management and organisational behaviour.
   (c) Elucidate Integrative Management Perspective.
   (d) Briefly discuss the various types of controls.
   (e) Figure out the conditions appropriate for principle of Decentralisation to take place.
   (f) Throw light on the some of the most effective conflict management techniques
   (g) Elaborate the stages of planning process.
   (h) Explain the various barriers to effective communication in modern time period.

(i) Briefly describe the Managerial Grid theory of Leadership.

(j) What are OD Interventions ? Enlist the major types of OD Interventions.

लघु उत्तरीय प्रश्न :

(अ) डेविड मैक्लीलैंड के आवश्यकता सिद्धान्त का वर्णन कीजिए।

(ब) प्रबन्धन तथा संगठनात्मक व्यवहार में संबंध स्थापित कीजिए।

(स) एकीकृत प्रबन्ध परिदृश्य का वर्णन कीजिए ।

(द) नियंत्रण के विभिन्न प्रकारों का संक्षेप में वर्णन कीजिए ।

(इ) विकेन्द्रीकरण के सिद्धान्त का स्थान ग्रहण करने वाली उपयुक्त दशाओं को रेखांकित कीजिए ।

(फ) कुछ सर्वाधिक प्रभावी संघर्ष प्रबन्ध तकनीकियों पर प्रकाश डालिए ।

(ग) योजना प्रक्रिया के स्तरों को समझाइए ।

(ह) आधुनिक समय में प्रभावी संचार में आने वाले विभिन्न अवरोधों का वर्णन कीजिए ।

(ई) नेतृत्व का प्रबन्धकीय श्रेणी सिद्धान्त का संक्षिप्त वर्णन कीजिए ।

(ज) OD हस्तक्षेप क्या हैं ? OD हस्तक्षेपों के प्रमुख प्रकार बताइए ।

2. Compare Classical Management Perspective and Neo-Classical Management Perspective. Which of these perspectives do you think is more suitable in the contemporary business environment ?
शास्त्रीय प्रबन्ध परिदृश्य तथा नव-शास्त्रीय प्रबन्ध परिदृश्य में तुलना कीजिए । समकालीन व्यापार पर्यावरण में कौनसा परिदृश्य सबसे उपयुक्त है ?

3. What is Personality ? Enlist its key determinants. Elucidate the Psychoanalytic theory of Personality.
व्यक्तित्व क्या है ? इसके निर्धारकों की सूची बनाइए । व्यक्तित्व के मनोविश्लेषण सिद्धान्त को विस्तार से समझाए ।

4. Describe the phenomena of Attitudes. How attitudes are formed ? Throw light on its components. Discuss some of the widely recognised attitudes with respect to employees and organisations.
अभिवृत्ति की घटना का वर्णन कीजिए । अभिवृत्ति कैसे बनायी जाती है ? इनके घटकों पर प्रकाश डालिए । कर्मकारों तथा संगठनों के संबंध में विस्तृत रूप से कुछ मान्य अभिवृत्तियों का वर्णन कीजिए।

5. Elaborate the concept of Perception. Also throw light on the different stages of the perceptual process.
धारणा की विचारधारा का वर्णन कीजिए । धारणात्मक प्रक्रिया के विभिन्न स्तरों पर भी प्रकाश डालिए ।

6. Define Organisational Change. Why individuals and organisations resist to change ? Identify the techniques/ mechanisms through which resistance to change overcome.
संगठनात्मक परिवर्तन की परिभाषा दीजिए । व्यक्ति तथा संगठन परिवर्तन का विरोध क्यों करते हैं ? उन तकनीकियों तथा यांत्रिकी का परिचय दीजिए जो परिवर्तन के प्रतिरोध को दूर करते हैं ।

Roll No. ..... Total Pages : 03

MDE/D-17 4061-S

BUSINESS ENVIRONMENT

MC-502

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all. Q. No. **1** in Part A is compulsory which carries 40 marks. Attempt *four* questions from Part B carrying 10 marks each.

Part A

1. Write short notes on the following :
   (a) What constitutes international business environment ?
   (b) How does foreign investment affect competition ?
   (c) Differentiate between principle of right and principle of justice.
   (d) How monetary policy helps in reducing the inflation rate ?
   (e) Differentiate between corporate management and corporate governance.
   (f) Discuss the challenges faced by private sector in India.

(g) Write note on Foreign Exchange Management Act.

(h) List the powers of consumer court.

(i) Discuss the marketing and labour problem of SSIs.

(j) How do marketing brriers affect international trade ? **10×4=40**

Part B

2. What factors bring about changes in consumer attitudes, tastes and preferences ? How do these changes affect production decisions of business firms ?

3. "Economic activities of a firm should make a social sense just as its social activities should make a business sense." Explain.

4. How do producers and sellers often exploit the consumers ? Explain the main legislative measures for the protection of consumers in the country.

5. How does industrial policy relevant for industrial growth ? What are the broad objectives that an industrial policy seeks to achieve in India ?

6. Discuss the major challenges facing SSIs. Do you think economic reforms have hit the segment the most ?

7. Is India's export performance satisfactory in relation to the trade reforms ? Suggest some ways to raise India's share in world exports.

8. Write note on international economic institutions. What role is played by these institutions ?

7. Derive the equilibrium of a monopolist. **10**
एक एकाधिकारी का संतुलन व्युत्पन्न कीजिए ।

8. Discuss the effects of inflation on borrowers lenders; exporters, importers, and buyers-sellers. **10**
ऋण लेने वाले, ऋणदाताओं, निर्यातकों, आयातकों तथा क्रेताओं-विक्रेताओं पर मुद्रा स्फीति का प्रभाव बताइए ।

Roll No. ..... Total Pages : 04

MDE/D-17 4062-S

MANAGERIAL ECONOMICS

MC-503

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all. Q. No. **1** carry 4 marks each is compulsory. Attempt any *four* more questions from remaining eight questions carrying 15 makrs each.
कुल **पाँच** प्रश्नों के उत्तर दीजिए । प्रश्न संख्या **1** अनिवार्य है जिसमें प्रत्येक के 4 अंक हैं शेष आठ प्रश्नों में से चार प्रश्न और कीजिए, प्रत्येक प्रश्न 15 अंक का है ।

1. Write short notes on the following : **4×10=40**
   (a) Profit Maximization as firm's objective
   (b) Managerial Economics as a Science
   (c) Cross elasticity of demand
   (d) Scenario Forecast
   (e) Meaning of returns to scale
   (f) Long run average cost curve
   (g) Features of monopolistic competition
   (h) International price dumping
   (i) Stagflation
   (j) Cobweb Model.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) लाभ अधिकतमीकरण फर्म के उद्देश्य के रूप में

(ब) प्रबन्धकीय अर्थशास्त्र विज्ञान के रूप में

(स) माँग की आड़ी लोच

(द) पूर्वानुमान का परिदृश्य

(इ) पैमाना प्रतिफल का अर्थ

(फ) दीर्घकालीन औसत लागत वक्र

(ग) एकाधिकार प्रतियोगिता की विशेषताएँ

(ह) अन्तर्राष्ट्रीय बाजार मूल्य गिराना (राशिपतन)

(ई) मुद्रास्फीति जनित मंदी

(ज) कॉबवैब मॉडल ।

2. Discuss the role of a managerial economist in the present competitive world. **10**

वर्तमान विश्व प्रतियोगिता में प्रबन्धकीय अर्थशास्त्री की भूमिका बताइए ।

3. Discuss the determinants of demand using a general demand functions. **10**

सामान्य माँग फलन का प्रयोग करते हुए माँग के निर्धारकों का वर्णन कीजिए ।

4. Write a note on types and classification of demand forecasting techniques. **10**

माँग पूर्वानुमान तकनीकि के प्रकारों तथा वर्गीकरण पर एक नोट लिखिए ।

5. Derive the consumer equilibrium conditions using indifference curve approach. **10**

उदासीन वक्र उपागम का प्रयोग करते हुए उपभोक्ता संतुलन की दशाओं को व्युत्पन्न कीजिए ।

6. Discuss the steps involved in estimation of a production function of an industry of the following form :

$$Q = AL^{\alpha}K^{\beta}$$

where.

$Q \rightarrow$ Economic value added

$A \rightarrow$ Total Factor Productivity

$L \rightarrow$ No. of employed persons

$K \rightarrow$ Net capital employed after depreciation

$\alpha \rightarrow$ Labour elasticity of output

$\beta \rightarrow$ Capital elasticity of output. **10**

निम्नलिखित रूप में एक उद्योग के उत्पादन फलन के आकलन में निहित कदमों का वर्णन कीजिए :

$$Q = AL^{\alpha}K^{\beta}$$

जहाँ

$Q \rightarrow$ आर्थिक मूल्य वर्धित

$A \rightarrow$ कुल कारक उत्पादकता

$L \rightarrow$ कार्य में लगे व्यक्तियों की संख्या

$K \rightarrow$ ह्रास के बाद प्रयुक्त शुद्ध पूँजी

$\alpha \rightarrow$ आगम की श्रम लोच

$\beta \rightarrow$ आगम की पूँजी लोच ।

Roll No. ..... Total Pages : 03

MDE/D-17 4063-S

ADVANCED STATISTICS

MC-504

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory and attempt *four* questions out of remaining seven questions.

Compulsory Question

1. (i) What is Mean ? Why is it superior to other measures of central tendency ?

(ii) The first four moments of a distribution about the value 4 are 1, 4, 10 and 45. Discuss the Kurtosis for the distribution.

(iii) Explain the concept of skewness.

(iv) 'A' and 'B' take turns in throwing two dice, the first to throw 9 being awarded the prize. Find their chances of winning.

(v) Explain the terms :

(a) Random experiment

(b) Sample point and sample space.

(vi) Describe the chief-characteristics of Poisson distribution.

(vii) Differentiate between point and interval estimation.

(viii) Write short note on 'Law of large numbers'.

(ix) Why should the non-parametric methods be preferably used ?

(x) Write short note on 'Chi-square test of goodness of fit'.

2. (a) Differentiate between multiple and partial correlation.

(b) The lines of regression of Y on X and X on Y are $Y = X + 5$ and $16X - 9Y = 94$, respectively find $\bar{X}$ and $\bar{Y}$.

3. State and prove the multiplicative law of probability.

4. Define normal distribution. What are the salient features of a normal curve ? Why is this curve given a central place in statistics ?

5. Explain the various quantitative methods which are useful for decision-making under uncertainty.

6. Explain F-test for equality of population variance. Applying this test show that the following samples come from the same normal population :

Sample	Size	Sample Mean	Sum of Squares of deviation from the mean
1	10	15	90
2	12	14	108

(Given that $F_{0.05}(9,11) = 2.90$)

7. Explain the following :

(a) *t*-test for difference of means

(b) *z*-test.

8. Describe Wald-Wolfowitz run test for identicalness of two populations.

Roll No. ..... Total Pages : 05

MDE/D-17 4065-S

ACCOUNTING FOR MANAGERIAL DECISIONS

MC-506

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory. Every sub-part of Q. No. 1 is of 4 marks. All other questions are of 10 marks each.
प्रत्येक इकाई से **एक** प्रश्न चुनते हुए कुल **पाँच** प्रश्नों के उत्तर दीजिए । प्रश्न संख्या **1** अनिवार्य है । प्रश्न संख्या 1 का प्रत्येक उप-भाग 4 अंकों का है । अन्य सभी प्रश्नों के अंक (10) समान हैं ।

1. (i) List the steps involved in the installation of management accounting system.
प्रबन्ध लेखांकन पद्धति को लागू करने में निहित कदमों की सूची बताइए ।

(ii) What are the limitations of financial statement analysis ?
वित्तीय विवरण विश्लेषण की सीमाएँ क्या हैं ?

(iii) How will you calculate the cash from operation ?
ऑपरेशन्स से नकद की गणना कैसे की जाती है ?

(iv) Differentiate the return on investment and residual income approaches of performance measures ?
निष्पादन साधनों के विनियोग पर प्रत्याय तथा आवासीय आय उपागमों में अंतर स्पष्ट कीजिए ।

(v) What do you mean by market based transfer pricing ?
बाजार आधारित हस्तान्तरण मूल्य-निर्धारण से आप क्या समझते हैं ?

(vi) What are the steps involved in Zero-bases budgeting ?
शून्य-आधारित बजटिंग में निहित चरण क्या हैं ?

(vii) Write short note on Performance budgeting ?
निष्पादन बजटिंग पर एक टिप्पणी लिखिए ।

(viii) Explain the price earning ratio and its uses.
मूल्य अर्जित अनुपात तथा इसके प्रयोगों का वर्णन कीजिए।

(ix) Describe the angle of incidence.
आपतन कोण का वर्णन कीजिए ।

(x) Describe the activity based costing.
कार्यशीलता आधारित मूल्य-निर्धारण का वर्णन कीजिए ।

2. 'Management Accounting aims at providing financial results of the business to the management for taking decision.' Explain by bringing out advantages of management accounting.
'प्रबन्ध लेखांकन का उद्देश्य प्रबन्ध को व्यापार के वित्तीय परिणाम देकर निर्णय लेना होता है ।' प्रबन्ध लेखांकन के लाभों सहित वर्णन कीजिए ।

3. Explain the role of reporting system in effective management. Discuss the various kinds of reports prepared for different levels of management.
प्रभावी प्रबन्ध में रिपोर्टिंग प्रणाली की भूमिका का वर्णन कीजिए । प्रबन्ध के विभिन्न स्तरों के लिए तैयार की गई रिपोर्टों का वर्णन कीजिए ।

4. "The aim of responsibility accounting is not to blame, instead, it is to evaluate performance and providing feedback so that future operation can be improved." Discuss.
"जिम्मेदारी लेखांकन का उद्देश्य दोष लगाने का नहीं है, अपितु निष्पादन का मूल्यांकन करना तथा पश्चभरण देना है ताकि भविष्य में संचालन बढ़ाया जा सके ।" वर्णन कीजिए ।

5. Describe the various ratios that are likely to help the management of a financial institution in forming an opinion on the financial position of the borrower.
उन विभिन्न अनुपातों का वर्णन कीजिए जो उधार लेने वालों की वित्तीय स्थिति पर विचार बनाने में वित्तीय संस्था के प्रबन्ध की सहायता करते हैं ।

6. From the following information compute :
(a) Mix
(b) Price
(c) Usage variances.

	Standard			Actual		
	Quantity (Kg.)	Unit Price (Rs.)	Total (Rs.)	Quantity (Kg.)	Unit Price (Rs.)	Total (Rs.)
Material A	4	1.00	4.00	2	3.50	7.00
Material B	2	2.00	4.00	1	2.00	2.00
Material C	2	4.00	8.00	3	3.00	9.00
Total	8	2.00	16.00	6	3.00	18.00

निम्नलिखित सूचना से गणना कीजिए :

(अ) मिश्रण

(ब) कीमत

(स) यूसेज प्रसरण ।

	मानक			वास्तविक		
	मात्रा (किग्रा.)	इकाई मूल्य (रु.)	कुल (रु.)	मात्रा (किग्रा.)	इकाई मूल्य (रु.)	कुल (रु.)
पदार्थ A	4	1.00	4.00	2	3.50	7.00
पदार्थ B	2	2.00	4.00	1	2.00	2.00
पदार्थ C	2	4.00	8.00	3	3.00	9.00
कुल	8	2.00	16.00	6	3.00	18.00

7. A company sold in two successive periods 7,000 units and 9.000 units and has incurred a loss of Rs. 10,000 and earned Rs. 10,000 as profit respectively.

The selling price can be assumed as Rs. 100 per unit.

You are required to calculate :

(a) The amount of fixed expenses

(b) The number of units of break-even

(c) The number of units to earn a profit of Rs. 40,000.

एक कम्पनी ने दो क्रमागत अवधि में 7,000 तथा 9,000 इकाइयाँ बेचीं तथा क्रमशः 10,000 रु. की हानि हुई तथा 10,000 रु. का लाभ कमाया ।

विक्रय मूल्य 100 रु. प्रति इकाई मान लीजिए :

आपको गणना करनी है :

(अ) स्थायी व्यय की राशि

(ब) सम-विच्छेद पर इकाइयों की संख्या

(स) 40,000 रु. का लाभ कमाने के लिए इकाइयों की संख्या ।

8. Discuss briefly the contemporary issues in Management Accounting.

प्रबन्ध लेखांकन में समकालीन मुद्दों को संक्षेप में समझाइए ।

Roll No. ..... Total Pages : 03

MDQ/D-17 **4215-S**

COMPUTER APPLICATION TO BUSINESS AND E-COMMERCE

MC-601

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory. All questions carry equal marks.

1. (i) What is the difference between volatile memory and non-volatile memory ?

(ii) What do you understand by optical storage devices ?

(iii) What is the difference between impact and non-impact printers ?

(iv) What is Program ?

(v) What is the difference between GUI and CUI ?

(vi) What is computer network ?

(vii) What is the difference between Internet and WWW ?

(viii) What is URL ?

(ix) Define database.

(x) What is an Operating system ?

2. What do you understand by a computer system ? What are the difference units in a computer system ? Draw the block diagram of a computer system and discuss in detail the functions performed by its different units.

3. What do you understand by Local Area Network (LAN) ? What are the different network topologies ? Discuss them with their merits and demerits.

4. (a) What is Internet ? What is the difference between Internet, Intranet and Extranet ? Explain.
   (b) Write a note on evolution of Internet.

5. (a) What do you understand by e-Commerce ? What are its limitations ? Discuss.
   (b) What is the difference between application software and system software ? Explain.

6. What do you understand by data and information ? What are the desirable qualities of information ? Discuss the different activities carried out in electronic Data Processing (EDP).

7. Write notes on the following :
   (a) Information Technology Act
   (b) Video Conferencing.

8. (a) What do you understand by Electronics Spreadsheet ? What are its characteristic features ? Explain.
   (b) What is Multimedia ? Discuss.

7. State and differentiate between the stock options and futures. Which one is a better risk hadging tool in steady market conditions and why ? Explain. 5+5=10

स्टॉक विकल्प तथा वायदा के बीच अन्तर का वर्णन कीजिए । स्थिर बाजार दशाओं के जोखिम दूर करने वाले उत्तम उपकरण कौनसे हैं और क्यों ? वर्णन कीजिए ।

8. Write notes on the following : 5+5=10

(a) Methods of selling securities in the primary market

(b) Listing of securities in stock exchanges.

निम्नलिखित पर टिप्पणियाँ लिखिए :

(अ) प्राथमिक बाजार में विक्रय प्रतिभूतियों की विधियाँ

(ब) स्टॉक विनिमय में प्रतिभूतियों की सूची बनाना ।

Roll No. ..... Total Pages : 04

MDQ/D-17 4217-S

SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

MC-603

Time : Three Hours] [Maximum Marks : 80

Note : Q. No. 1 carrying 40 marks is compulsory. Attempt any *four* questions form the Question Nos. **2-8** carrying 10 marks each.

प्रश्न संख्या **1** अनिवार्य है तथा 40 अंक का है । प्रश्न संख्या **2-8** तक में से किन्हीं **चार** प्रश्नों के उत्तर दीजिए । प्रत्येक प्रश्न 10 अंक का है ।

1. Attempt all the short answer types questions given below : **10×4=40**

(i) What do you understand by investment analysis ? Explain.

(ii) State and explain value investing.

(iii) Define investment rise and describe its components.

(iv) State the eligibility criteria for a depository participants.

(v) State and explain term structure of interest rates.

(vi) What is Dow Theory ? Explain.

(vii) What do you mean by 'Yield to maturity' ? Explain.

(viii) What is 'Security Market Line' ? Explain.

(ix) State and explain Jensen's model.

(x) What do you understand by 'Option premium' ? Explain.

नीचे दिये गये सभी लघुउत्तरीय प्रश्नों के उत्तर दीजिए :

(i) विनियोग विश्लेषण से आप क्या समझते हैं ? वर्णन कीजिए ।

(ii) मूल्य विनियोजन का वर्णन कर व्याख्या कीजिए ।

(iii) विनियोग जोखिम की परिभाषा दीजिए तथा इसके घटकों का वर्णन कीजिए ।

(iv) जमा भागीदारी के लिए योग्यता मानदंड का वर्णन कीजिए ।

(v) ब्याज दर की संरचना का वर्णन कर व्याख्या कीजिए ।

(vi) डाऊ सिद्धान्त क्या है ? व्याख्या कीजिए ।

(vii) परिपक्वता का उत्पादन से आप क्या समझते हैं ? वर्णन कीजिए ।

(viii) सुरक्षा बाजार लेख क्या है ? व्याख्या कीजिए ।

(ix) जेन्सन के मॉडल का वर्णन कर व्याख्या कीजिए ।

(x) 'विकल्प प्रीमियम' से आप क्या समझते हैं ? वर्णन कीजिए ।

2. Describe in brief stock trading mechanism on Indian Stock exchanges along with relevant SEBI guidelines theret. 10
सेबी मार्गदर्शन की प्रांसगिकता के साथ-साथ भारतीय स्टॉक विनिमयों पर स्टॉक व्यापार यांत्रिकी का वर्णन संक्षेप में कीजिए ।

3. What do you understand by 'Stock market efficiency' ? Describe its forms and the tests for various forms. 4+6=10
स्कन्ध बाजार क्षमता से आप क्या समझते हैं ? इसके स्वरूपों तथा परीक्षणों का वर्णन विभिन्न आकारों के लिए कीजिए ।

4. What is portfolio optimisation ? Describe, how is sharpe single index facilitate construction of efficient portfolios. 4+6=10
पोर्टफोलियो अनुकलन क्या है ? कुशल फोर्टफोलियो की संरचना में सिंगल सूचकांक कैसे सुविधाजनक है ? वर्णन कीजिए ।

5. Write a comprehensive note on the Fama's decomposition of port folio performance. 10
पोर्ट फोलियो प्रदर्शन के फेमा के अपघटन पर एक संक्षिप्त नोट लिखिए ।

6. Critically examine the validity of Capital Asset Pricing Model (CAPM) to explain underlying stock returns in todays volatile stock markets. 10
आज के अस्थिर शेयर बाजारों में अन्तर्निहित शेयरों की व्याख्या करने के लिए पूँजी सम्पत्ति कीमत निर्धारण मॉडल (CAPM) की वैधता का आलोचनात्मक परीक्षण कीजिए ।

Roll No. .....

Total Pages : 05

MDQ/D-17

4218-S

COMMERCE

MC-604

Higher Accounting and Accounting Theory

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *Five* questions. Q. No. **1** is compulsory of ten short answer type questions carrying 4 marks each is compulsory.

कुल **पाँच** प्रश्नों के उत्तर दीजिए । प्रश्न संख्या **1** अनिवार्य है जिसमें दस लघु उत्तरीय प्रश्न हैं और प्रत्येक प्रश्न 4 अंक का है, अनिवार्य है ।

(Compulsory Question)

(अनिवार्य प्रश्न)

1. Short answer type questions :

(a) Explain Inductive approach of accounting theory formulation

(b) What do you mean by Loss of Profit Insurance ?

(c) What is Internal Reconstruction of Companies ?

(d) Distinguish between amalgamation in the nature of merger and amalgamation in the nature of purchase.

(e) What is Corporate Dividend Tax ?

(f) "Valuation of Assets", explain.

(g) Define Periodic reporting.

(h) Define Lease Accounting.

(i) Distinguish between expenses and losses.

(j) What do you understand by the expression "consolidation of financial statements" ? **10×4=40**

लघु उत्तरीय प्रश्न :

(अ) लेखांकन सिद्धांत सूत्रीकरण के आगमनात्मक दृष्टिकोण को समझाइए ।

(ब) "लाभों की क्षति" के बीमे से आपका क्या आशय है ?

(स) कम्पनी के आन्तरिक पुनर्निर्माण से आप क्या समझते हैं ?

(द) मिश्रण की प्रकृति के एकीकरण तथा क्रय की प्रकृति के एकीकरण में अन्तर स्पष्ट कीजिए ।

(इ) कॉरपोरेट लाभांश कर क्या है ?

(फ) "सम्पतियों का मूल्यांकन" को समझाइए ।

(ग) सामाजिक रिपोर्टिंग क्या है ?

(ह) पट्टा लेखांकन क्या है ?

(ई) व्यय एवं हानि में अन्तर कीजिए ।

(ज) "वित्तीय विवरणों के एकीकरण से आप क्या समझते हैं ?

2. What do you understand by preacquisition and post-acquisition profits relating to purchase of shares of subsidiary company ? How will you calculate such profits. **10**

सहायक कम्पनी के अंशों के क्रय के पूर्व और क्रय के पश्चात् के लाभों से आप क्या समझते हैं और इनकी गणना किस प्रकार करेंगे ?

3. Write notes on the following :

(a) Divisible Profit

(b) Deferred Tax Liability.

(c) Contingent liabilities and commitments. **10**

निम्नलिखित पर टिप्पणियाँ लिखिए :

(अ) विभाजन योग्य लाभ

(ब) स्थागित कर दायित्व

(स) आकस्मिक दायित्व एवं वचनबद्धताएँ ।

4. Define the term "gains" and "losses". Discuss the principles for recognition of gains and losses in accounting. **10**

"लाभ" तथा "हानि" को बताइये । लेखांकन में "लाभ" तथा 'हानि" से सम्बन्धित सिद्धान्तों को बताइये ।

5. Discuss the descriptive approach in financial accounting theory. What are the limitations of this approach ? **10**
वित्तीय लेखांकन सिद्धांत के वर्णनात्मक दृष्टिकोण को समझाइए । इस दृष्टिकोण की सीमाएँ क्या हैं ?

6. Write a critical note on social reporting practices in India. **10**
भारत में सामाजिक रिपोर्टिंग के प्रचलनों पर एक आलोचनात्मक नोट लिखिए ।

7. What do you understand by "Lease Accounting" ? What entries are passed in the books of lessor and lessee ? **10**
"पट्टा लेखांकन" क्या है ? पट्टादाता तथा पट्टेदार की पुस्तकों में कौन-कौनसी प्रविष्टियाँ की जाती हैं ?

8. A Ltd. goes into liquidation on 31st March, 2015, having assets appearing in the books as follows :
Works and other properties ₹ 9,00,000 Liquid Assets ₹ 1,00,000. Its liabilities are ₹ 2,00,000 and its capital (paid up) ₹ 10,00,000. The business is sold to B company for ₹ 5,00,000 payable as to ₹ 4,50,000 in equity shares of ₹ 10 each credited with ₹ 7.50 per share paid up and ₹ 50,000 in cash. Close the books of the company in liquidation. Also prepare opening entries in the books of B company. **10**

A लिमिटेड का 31 मार्च, 2015 को समापन हो जाता है, इस तिथि को इसकी पुस्तकों में निम्न सम्पत्तियाँ थीं :
फैक्टरी एवं अन्य सम्पत्तियाँ ₹ 9,00,000, तरल सम्पत्तियाँ ₹ 1,00,000, इसके दायित्व ₹ 2,00,000 है और चुकता पूँजी ₹ 10,00,000 है । व्यवसाय B कम्पनी को ₹ 5,00,000 में बेच दिया गया, जिसमें से ₹ 4,50,000 के समता अंश मिलेंगे (प्रत्येक अंश ₹ 10 का है, जिसमें से प्रति अंश ₹ 7.50 चुकता है) और ₹ 50,000 नकद मिलेंगे । समापन होने वाली कम्पनी की पुस्तकें बनाइए । B कम्पनी की पुस्तकों में प्रारम्भिक प्रविष्टियाँ भी बनाइए ।

Roll No. .....

Total Pages : 03

MDQ/D-17

4219-S

ADVERTISING AND SALES MANAGEMENT

MC-605

Time : Three Hours]

[Maximum Marks : 100

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory. कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या **1** अनिवार्य है ।

1. Explain the following by limiting the answer to half page : **10×4=40**

(i) Promotion Mix

(ii) Advertising budget

(iii) Media Scheduling

(iv) Personal Selling

(v) Propsecting

(vi) Sales territory

(vii) Sales contests

(viii) Market Potential

(ix) Objectives of sales management

(x) Sales recruitment.

प्रत्येक प्रश्न का उत्तर आधे पेज में दीजिए :

(i) पोन्नति मिश्रण

(ii) विज्ञापन बजट

(iii) मीडिया सूचीयन

(iv) व्यक्तिगत विक्रय

(v) प्रोस्पेक्टिंग

(vi) विक्रय क्षेत्र

(vii) बिक्री प्रतियोगिता

(viii) बाजार संभावना

(ix) विक्रय प्रबन्ध के उद्देश्य

(x) विक्रय भर्ती ।

2. What is Advertising ? Discuss the objectives of advertising. Explain the social aspects of advertising. **10**

विज्ञापन क्या है विज्ञापन के उद्देश्यों का वर्णन कीजिए । विज्ञापन के सामाजिक पहलुओं की चर्चा कीजिए ।

3. Discuss the factors influencing the choice of advertising media. **10**

विज्ञापन मीडिया के विकल्प को प्रभावित करने वाले कारकों का वर्णन कीजिए ।

4. Explain your understanding of sales management. **10**

विक्रय प्रबन्धन की सूझ-बूझ का वर्णन कीजिए ।

5. Discuss buying formula and behavioural equal theories of selling. **10**

खरीद सूत्र तथा विक्रय का व्यवहार समानता सिद्धान्तों का वर्णन कीजिए ।

6. What is the purpose of creating sales organisation ? Discuss the procedure of setting up a sales organisation. **10**

विक्रय संगठन बनाने का क्या उद्देश्य है ? विक्रय संगठन की स्थापना की प्रक्रिया का वर्णन कीजिए ।

7. What are the requirements of a good sales compensation plan ? Make a comparison of different types of sales compensation plan. **10**

अच्छे विक्रय क्षतिपूर्ति योजना की आवश्यकताओं का वर्णन कीजिए। विक्रय क्षतिपूर्ति योजना के विभिन्न प्रकारों की तुलना कीजिए ।

8. Write notes on the following : **10**

(a) Managing advertsing agency and client relationship

(b) Sales quotas.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) मैनेजिंग विज्ञापन एजेंसी तथा ग्राहक सम्बन्ध

(ब) विक्रय कोटा ।

9. Write notes on any *two* of the following :

(a) Goodness of fit

(b) Experimental research

(c) ANOVA.

निम्नलिखित में से किन्हीं **दो** पर टिप्पणियाँ लिखिए :

(अ) स्वस्थ होने की अच्छाइयाँ

(ब) अनुभवात्मक शोध

(स) ANOVA.

Roll No. .....

Total Pages : 04

MDQ/D-17 **4220-S**

COMMERCE

MC-606

Marketing Research

Time : Three Hours] [Maximum Marks : 80

Note : Q. No. **1** is compulsory with ten parts (4 marks each); each part's answer should not exceed half page. Attempt any *four* questions from the remaining eight questions (15 marks each).

प्रश्न संख्या **1** अनिवार्य है । इसमें दस भाग हैं, प्रत्येक भाग 4 अंक का है । प्रत्येक भाग का उत्तर आधे पेज से अधिक न हो । शेष आठ प्रश्नों में से कोई **चार** प्रश्न कीजिए । प्रत्येक प्रश्न 15 अंक का है ।

1. (i) Mention the problems that can be investigated in marketing research.

उन समस्याओं का उल्लेख कीजिए जिनकी विपणन अनुसंधान में जाँच की जा सकती है ?

(ii) What is a Research Plan ?

शोध योजना क्या है ?

(iii) What is a research instrument ?
शोध उपकरण क्या है ?

(iv) What are the sources of data ?
आंकड़ों के क्या स्रोत हैं ?

(v) Who conducts marketing research job ?
विपणन शोध कार्य कौन करता है ?

(vi) When does a researcher use observation method ?
एक शोधकर्ता कब पर्यवेक्षण विधि का प्रयोग करता है ?

(vii) Distinguish between sampling and non-sampling errors.
प्रतिचयन तथा गैर-प्रतिचयन त्रुटियों में अन्तर बताइए ।

(viii) What are non-parametric tests ?
गैर-पैरामैट्रिक परीक्षण क्या है ?

(ix) What is the purpose of factor analysis ?
कारक विश्लेषण का क्या उद्देश्य है ?

(x) What is media research ?
मीडिया शोध क्या है ?

2. How is marketing research defined ? Mention the steps involved in its conduct.
विपणन शोध को कैसे परिभाषित किया जाता है ? इसमें निहित कदमों का वर्णन कीजिए ।

3. Illustrate the importance of marketing research.
विपणन शोध के महत्त्व को उदाहरण सहित बताइए ।

4. Differentiate between exploratory and descriptive research designs.
खोजपूर्ण तथा वर्णनात्मक अनुसंधान डिजाइन में अन्तर बताइए ।

5. What is a sampling design ? What are the considerations used in its framing ?
प्रतिचयन डिजाइन क्या है ? इसको बनाने में किन बातों का ध्यान रखा जाता है ?

6. What are the steps followed in developing a questionnaire ?
एक प्रश्नावली तैयार करने में अपनाये जाने वाले चरण क्या हैं ?

7. What are the options available to a researcher in deciding the use of an analysis technique ?
एक विश्लेषण तकनीकि के प्रयोग में एक अनुसंधानकर्ता को कौनसे विकल्प उपलब्ध हैं ?

8. What is the purpose of advertising research ? How is it carried out ?
विज्ञापन शोध का क्या उद्देश्य है ? ये कैसे पूरे किये जाते हैं ?

5. Write a detailed note on future trends in compensation management.
क्षतिपूर्ति प्रबन्ध में भविष्य की प्रवृत्तियों पर एक विस्तृत नोट लिखिए।

6. What do you mean by 'Pay for Performance (PFP) ? What factors should organisations take into consideration before implimenting a PFP system ?
'प्रदर्शन के लिए भुगतान (PFP) से आप क्या समझते हैं ? PFP प्रणाली लागू करने से पहले संगठनों को कौन-कौनसे कारक ध्यान में रखने चाहिए ?

7. What are the components of compensation package of special groups ?
विशेष समूहों के क्षतिपूर्ति पैकेज के घटक क्या हैं ?

8. Explain the provisions fixation of minimum rates of wage working hours and determination of wages and claims etc. under the Chapter II of the Minimum Wages Act, 1948.
न्यूनतम मजदूरी अधिनियम, 1948 के तहत मजदूरी की न्यूनतम दर, कार्य के घण्टे के स्थिरीकरण तथा मजदूरी तथा परिवादों इत्यादि के निर्धारण के प्रावधानों का वर्णन कीजिए ।

Roll No. ..... Total Pages : 04

MDQ/D-17 4223-S

COMPENSATION MANAGEMENT

MC-609

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, however Q. No. **1** is compulsory.
कुल **पाँच** प्रश्नों के उत्तर दीजिए । प्रश्न संख्या **1** अनिवार्य है ।

1. Short answer type questions : **10×4=40**

(i) Explain the concept and characteristics of reward/compensation.

(ii) Outline the components of executive compensation.

(iii) What is 'just wage' doctrine ?

(iv) Define the concepts-minimum wage, Living wage and Fair wage.

(v) Define the concept of 'Wage Differential' and its importance.

(vi) Explain the concept of compensation management and delayered organisations.

(vii) What are the objectives of incentives in compensation management ?

(viii) What are the main features of 'The Workmen's Compensation Act, 1923' ?

(ix) Explain the duty of employer to pay equal remuneration to men and women workers for same work or work of similar nature under the "The Equal Remuneration Act, 1976".

(x) What are the salient features of 'The Minimum Wages Act, 1948' ?

लघु उत्तरीय प्रश्न :

(i) इनाम/क्षतिपूर्ति की अवधारणा तथा विशेषताओं का वर्णन कीजिए ।

(ii) कार्यकारिणी क्षतिपूर्ति के घटकों की रूपरेखा दीजिए ।

(iii) 'उचित मजदूरी' सिद्धान्त क्या है ?

(iv) न्यूनतम मजदूरी, जीविका मजदूरी तथा उचित मजदूरी की अवधारणा की परिभाषा दीजिए ।

(v) मजदूरी विभेद तथा इसके महत्त्व की अवधारणा को परिभाषित कीजिए ।

(vi) क्षतिपूर्ति प्रबन्धन तथा स्थगित संगठनों की अवधारणा का वर्णन कीजिए ।

(vii) क्षतिपूर्ति प्रबन्ध में प्रोत्साहनों के उद्देश्य क्या हैं ?

(viii) कर्मकार क्षतिपूर्ति अधिनियम, 1923 की प्रमुख विशेषताएँ क्या हैं ?

(ix) 'समान पारिश्रमिक अधिनियम, 1976' के अन्तर्गत समान कार्य तथा समान प्रकृति के कार्य के लिए पुरुषों तथा महिलाओं के लिए पारिश्रमिक भुगतान करने के लिए नियोक्ता के कर्तव्यों का वर्णन कीजिए ।

(x) "न्यूनतम मजदूरी अधिनियम, 1948 की प्रमुख विशेषताएँ क्या हैं ?

2. What is the principle of equity in compensation management ? How do equity considerations affect compensation management ? How can equity in compensation management improved ?
क्षतिपूर्ति प्रबन्ध में समता का सिद्धान्त क्या है ? समता विचार क्षतिपूर्ति प्रबन्ध को कैसे प्रभावित करते हैं ? क्षतिपूर्ति प्रबन्ध में समता को कैसे बढ़ाया जा सकता है ?

3. Explain strategic perspectives of compensation organisations. Also explain the types of strategies adopted by them.
क्षतिपूर्ति संगठनों की रणनीति परिदृश्य का वर्णन कीजिए । उनके द्वारा अपनायी गयी रणनीतियों के प्रकारों की भी व्याख्या कीजिए ।

4. What are reasons for introducing broad banding in compensation system ? Also discuss the benefits of broad-banding for an organsiation.
क्षतिपूर्ति प्रणाली में ब्रॉडबैंडिंग शुरू करने के क्या कारण हैं ? किसी संगठन के लिए ब्रॉडबैंडिंग के लाभों का भी वर्णन कीजिए ।

Roll No. .....

Total Pages : 3

MDE/D-17

10281

ORGANISATIONAL BEHAVIOUR

Paper–MCIT-101

Time : Three Hours]

[Maximum Marks : 80

Note : Question No. 1 is compulsory and carries 40 marks. Attempt any *four* questions out of remaining 7 questions and each question carries 10 marks.

नोट : प्रश्न सं. **एक** अनिवार्य है जो 40 अंकों का है। बाकि के 7 प्रश्नों में से कोई से **चार** प्रश्न कीजिए। प्रत्येक प्रश्न 10 अंकों का है।

Compulsory Question (अनिवार्य प्रश्न)

1. Answer the following in short :

(a) Nature of people.

(b) Principle of Management.

(c) Managerial implications of perception.

(d) Important features of psychoanalytic theory of Freud.

(e) Group Composition.

(f) Analysis of strocking.

(g) Concept of Holistic theory of personality.

(h) Modern approach to O.B.

(i) Johari Window.

(j) Significance of learning.

निम्न के उत्तर संक्षेप में दीजिए :

(क) लोगों की प्रकृति।

(ख) प्रबंधन के सिद्धान्त।

(ग) अवबोधन के प्रबंधकीय निहितार्थ।

(घ) फ्रीड के मनोविश्लेषण सिद्धान्त की महत्वपूर्ण विशेषताएं।

(ङ) समूह संरचना।

(च) स्ट्रोक का विश्लेषण।

(छ) व्यक्तित्व के समग्र सिद्धान्त की अवधारणा।

(ज) संगठनात्मक व्यवहार के लिए आधुनिक दृष्टिकोण।

(झ) जौहरी विन्डोज़।

(ञ) अधिगम का महत्त्व।

2. What are Howthrone experiments? What are the implications of Howthrone experiments for O.B.
हॉथोर्न प्रयोग क्या हैं? संगठनात्मक व्यवहार के लिए हॉथोर्न प्रयोग के निहितार्थ क्या हैं?

3. What is operant theory of learning? What are its implication for explaining O.B.?
अधिगम का ऑपरेंट सिद्धान्त क्या है? संगठनात्मक व्यवहार की व्याख्या के लिए इसके निहितार्थ क्या हैं?

4. What constrains the power of personality traits to precisely predict behaviour? Discuss.

व्यवहार को ठीक से अभिव्यक्त करने के लिए व्यक्तित्व के गुणों का प्रभाव क्या अवरोध करता है।

5. What are the determinants of O.B.? Critically discuss the demerits of O.B.
संगठनात्मक व्यवहार के निर्धारक क्या हैं? संगठनात्मक व्यवहार के दोषों की आलोचनात्मक विवेचना कीजिए।

6. What is the concept of T.A. How T.A. is helping management to understand the behaviour of the employees.
यात्रा भत्ता की अवधारणा क्या है? कर्मचारी के व्यवहार को समझने के लिए यात्रा भत्ता प्रबंधन की कैसे सहायता कर रहा है?

7. What is the difference between group dynamics and group cohesiveness? Explain the determinants of cohesiveness.
समूह गतिशीलता और समूह संगलता के बीच क्या अंतर है? संगलता के निर्धारकों की व्याख्या कीजिए।

8. What is perception? Explain the external factors of distortion in perception.
अवबोधन क्या है? अवबोधन में विरूपण के बाह्य कारकों की व्याख्या कीजिए।

Roll No. ..... Total Pages : 3

MDE/D-17 **10282**

BUSINESS ENVIRONMENT

Paper : MCIT-102

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory.

नोट : कुल **पाँच** प्रश्नों के उत्तर दीजिए। प्रश्न सं. 1 अनिवार्य है।

1. Compulsory Question (अनिवार्य प्रश्न)

Answer the following in brief (Not more than half page) :

(a) Define Environment. 4

(b) Why there is a need of interaction matrix of different environment factors ? 4

(c) What are the economic objectives of Economic planning ? 4

(d) Elucidate Privatisation with example. 4

(e) What are the objectives of Disinvestment ? 4

(f) Explain the Transparency principle of Corporate Governance. 4

(g) Differentiate between Revenue deficit and Fiscal deficit. 4

(h) Name the industries where license is required. 4

(i) Discuss the penality provision under the Environment (Protection) Act. 4

(j) What is the social responsibility of business towards community ? 4

निम्नलिखित के उत्तर संक्षेप में दीजिए (अधिकतम आधे पृष्ठ में) :

(क) पर्यावरण को परिभाषित कीजिए।

(ख) विभिन्न वातावरणीय कारकों के इंटरैक्शन मैट्रिक्स की क्यों आवश्यकता है?

(ग) आर्थिक नियोजन के आर्थिक उद्देश्य क्या हैं?

(घ) निजीकरण को उदाहरण के साथ स्पष्ट कीजिए।

(ङ) विनिवेश के उद्देश्य क्या हैं?

(च) कॉर्पोरेट शासन प्रणाली के पारदर्शिता सिद्धान्त की व्याख्या कीजिए।

(छ) राजस्व घाटे और राजकोषीय घाटे के बीच अन्तर कीजिए।

(ज) उन उद्योगों के नाम बताइए जहाँ लाइसेंस आवश्यक है।

(झ) पर्यावरण (संरक्षण) अधिनियम के तहत दंड प्रावधान की विवेचना कीजिए।

(ञ) समुदाय की ओर व्यवसाय की सामाजिक जिम्मेदारियाँ क्या हैं?

2. Explain the nature of Business environment. Also discuss the interaction matrix of different environment factors. 10
व्यापारिक पर्यावरण की प्रकृति की व्याख्या कीजिए। विभिन्न पर्यावरण कारकों के इंटरैक्शन मैट्रिक्स की भी विवेचना कीजिए।

3. What is Globalisation ? Discuss the initiatives taken by Govt. of India in recent past in this regard. 10
भूमंडलीकरण क्या है? इस संबंध में हाल ही में भारत सरकार द्वारा उठाए गए कदमों की विवेचना कीजिए।

4. Define Business ethics. Why there is ethical dilemma ? Discuss the role of business ethics in the success of a business. 10
व्यावसायिक नैतिकता को परिभाषित कीजिए। नैतिक दुविधा क्यों होती है? व्यापार की सफलता में व्यावसायिक नैतिकता की भूमिका की विवेचना कीजिए।

5. What methods are being used in Monetary Policy ? Also critically examine its role in Indian economy. 10
मौद्रिक नीति में कौन-सी विधियों का इस्तेमाल किया जा रहा है? भारतीय अर्थव्यवस्था में इसकी भूमिका का आलोचनात्मक परीक्षण भी कीजिए।

6. What is Industrial sickness ? What are its causes ? Discuss the role of Government in this context. 10
बीमार उद्योग से क्या तात्पर्य है? इसके कारण क्या हैं? इस संदर्भ में सरकार की भूमिका की चर्चा कीजिए।

7. Discuss the major provisions of Competition Act in detail. 10
प्रतिस्पर्धा अधिनियम के मुख्य प्रावधानों की विस्तार से चर्चा कीजिए।

8. What is Consumer Protection ? Critically analyse the role of CPA, 1986 in Consumer protection. 10
उपभोक्ता सुरक्षा क्या है? उपभोक्ता संरक्षण में सी.पी.ए. (CPA), 1986 की भूमिका का आलोचनात्मक विश्लेषण कीजिए।

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Total Pages : 5

10283

MDE/D-17

ADVANCED STATISTICS

Paper : MCIT-103

Time : Three Hours] [Maximum Marks : 80

Note : The *first* question carrying 10 parts is compulsory and each part of it carries 4 marks. Attempt any *four* questions out of the remaining *seven* questions carrying 10 marks each.

नोट : प्रश्न न. एक में 10 भाग दिए हैं, प्रत्येक भाग 4 अंकों का है यह अनिवार्य है। बाकी के सात प्रश्नों में से कोई से **चार** प्रश्न कीजिए, प्रत्येक प्रश्न 10 अंकों का है।

1. Compulsory Question (अनिवार्य प्रश्न)

Explain/Answer the following in upto *one* page length each:

(a) Meaning of univariate analysis.

(b) Give specific examples when mode is preferred over mean.

(c) Give two examples of practical situations when Geometric Mean is recommended for use.

(d) Write down formulae of Mean Deviation and Coefficient of Variation.

(e) Show how correlation is independent of change of origin and scale.

(f) If P(A) = 0.40, P(B) = 0.70 and P (at least one of A and B) = 0.8, find P(only one of A and B).

(g) Comment on the following: For a binomial distribution, mean = 7 and variance = 11.

(h) Give the properties of Normal and Binomial distributions.

(i) Describe the terms precision and accuracy of a sample.

(j) Explain meaning and applications of Central Limit Theorem.

निम्नलिखित प्रश्नों की व्याख्या कीजिए। प्रत्येक का उत्तर 1 पृष्ठ की लम्बाई तक दीजिए।

(क) यूनीवेरियट विश्लेषण का अर्थ बताइए

(ख) जब माध्य से अधिक मोड को प्राथमिकता दी जाती है का विशिष्ट उदाहरण दीजिए।

(ग) व्यावहारिक स्थिति के ऐसे दो उदाहरण दीजिए जब उपयोग के लिए जियोमेट्रिक माध्य की सिफारिश की जाती है।

(घ) माध्य विचलन और भिन्नता के गुणक सूत्र को लिखिए।

(ङ) दर्शाइए सहसंबंध मूल और पैमाने के परिवर्तन से कैसे स्वतंत्र है।

(च) यदि P(A) = 0.40, P(B) = 0.70 और P (कम से कम A और B में से एक) = 0.8, ज्ञात कीजिए P (A और B में से केवल एक)।

(छ) निम्नलिखित पर टिप्पणी कीजिए :

एक द्विपद वितरण के लिए जिसका माध्य = 7 और विचरण = 11 है।

(ज) सामान्य और द्विपद वितरण के गुणों को बताइए।

(झ) शुद्धता और एक नमूने की सटीकता शब्दों का वर्णन कीजिए।

(ञ) केन्द्रीय सीमा प्रमेय का तात्पर्य और उपयोगिता की व्याख्या कीजिए।

2. From the prices of Shares A and B respectively given below, state which share is more stable in value :

Prices of A	55	54	52	53	56	58	52	50	51	49
Prices of B	108	107	105	105	106	107	104	103	104	101

नीचे दिए गए शेयरों A और B के मूल्यों से यह बताइए कि कौन से शेयरों का मूल्य अधिक स्थिर है?

A का मूल्य	55	54	52	53	56	58	52	50	51	49
B का मूल्य	108	107	105	105	106	107	104	103	104	101

3. From a bag containing 4 white and 6 red balls, three balls are drawn at random.

(a) Find the expected number of white balls drawn.

(b) If each white ball drawn carries a reward of Rs. 4 and each red ball of Rs. 6, find the expected reward of the draw.

एक बैग जिसमें 4 सफेद और 6 लाल गेंदें हैं जिसमें से तीन गेंद यादृच्छिक पर निकाली जाती हैं।

(क) निकाली गई सफेद बाल की अपेक्षित संख्या ज्ञात कीजिए।

(ख) यदि प्रत्येक सफेद बाल निकालने पर 4 रु. का इनाम मिलता है और लाल गेंद निकालने पर 6 रु. का इनाम मिलता है तो ड्रा के अपेक्षित इनाम को ज्ञात कीजिए।

4. In a normal distribution, 31 percent of the items are under 45 and 8 percent are over 64. Find the mean and standard deviation of the distribution.

एक सामान्य वितरण में 31 प्रतिशत वस्तुएं 45 से कम की हैं और 8 प्रतिशत 64 से अधिक की हैं तो वितरण के माध्य और मानक विचलन को ज्ञात कीजिए।

5. Explain what do you understand by the Sampling Distribution of a sample statistics ? Give an example of sampling distribution of difference of two means. What are applications of these distributions?

नमूना आंकड़ों के नमूने वितरण से आप क्या समझते हैं, व्याख्या कीजिए। दो माध्यों के अंतर के नमूने वितरण का एक उदाहरण दीजिए। इस वितरण की उपयोगिताएं क्या हैं?

6. Explain maximin, maximax and minimax regret criterion as used in decision making. Also explain the terms risk and uncertainty with example.

निर्णय लेने में उपयोग के रूप में मैक्सिमिन, मैक्सिमैक्स और मिनिमैक्स शौचनीय कसौटी की व्याख्या कीजिए। जोखिम और अनिश्चितता की भी उदाहरण सहित व्याख्या कीजिए।

7. Explain the following :

(a) Sampling errors and non-sampling errors.

(b) Systematic sampling and simple random sampling.

(c) Law of large numbers.

निम्नलिखित की व्याख्या कीजिए :

(क) प्रतिचयन त्रुटि और गैर प्रतिचयन त्रुटि।

(ख) व्यवस्थित नमूना और सरल यादृच्छिक नमूना।

(ग) बड़ी संख्या के कानून।

8. Show how regression coefficients are calculated in a situation involving more than two variables by taking an illustration ?

दर्शाइए कि प्रतिगमन के गुणांक की गणना ऐसी स्थिति में कैसे की जाती है जिसमें दृष्टांत लेते हुए दो से अधिक चर शामिल होते हैं?

8. What do you mean by online Marketing ? What are the components of Online Marketing ? Also discuss about the growing trend of Online Marketing. 10
ऑनलाइन विपणन से आपका क्या अभिप्राय है ? ऑनलाइन विपणन के घटक क्या हैं ? ऑनलाइन विपणन की बढ़ती प्रवृत्ति के बारे में भी चर्चा कीजिए।

Roll No. ..... Total Pages : 4

MDE/D-17 **10284**

MARKETING MANAGEMENT
Paper – MC-IT-104

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory.
नोट : कुल **पाँच** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 अनिवार्य है।

1. Compulsory Question (अनिवार्य प्रश्न)

Answer the following in brief (not more than half page) :
निम्नलिखित के संक्षेप में उत्तर दीजिए (आधे पृष्ठ से ज्यादा नहीं होना चाहिए) :

(i) "There is huge scope of Marketing". Discuss. 4
विपणन का विशाल कार्यक्षेत्र है। चर्चा कीजिए।

(ii) Define Marketing Mix. 4
संयुक्त विपणन को परिभाषित कीजिए।

(iii) Define routine consumer behaviour with example. 4
नियमित अपभोक्ता व्यवहार को उदाहरण सहित परिभाषित कीजिए।

(iv) What is a New Product ? 4
एक नया उत्पाद क्या है ?

(v) What is the role of Warranty in Marketing ? 4
विपणन में वारंटी की भूमिका क्या है ?

(vi) Discuss Resale Price Maintenance Strategy. 4

पुनर्विक्रय मूल्य अनुरक्षण रणनीति की विवेचना कीजिए।

(vii) What is Advertising ? 4

विज्ञापन क्या है ?

(viii) "Personal selling is key of success in complex product." Discuss. 4

मिश्रित उत्पाद में व्यक्तिगत बिक्री सफलता की कुंजी है। चर्चा कीजिए।

(ix) What is the role of Supply Chain Management in Distribution ? 4

प्रबन्धन में शृंखला प्रबन्धन वितरण की क्या भूमिका है ?

(x) How can Mass Media be used as Direct Media ? 4

मास मीडिया को कैसे प्रत्यक्ष मीडिया के रूप में इस्तेमाल किया जा सकता है ?

2. Define Marketing. Discuss the different concepts of marketing with the help of suitable examples. 10

विपणन को परिभाषित कीजिए। उपयुक्त उदाहरणों की सहायता से विपणन की विभिन्न अवधारणाओं पर चर्चा कीजिए।

3. "Marketing environment affects the Marketing system of a Modern Organisation." Elucidate. 10

''आधुनिक संगठन की विपणन प्रणाली को विपणन वातावरण प्रभावित करता है।'' स्पष्ट कीजिए।

4. "Building and Maintaining long-term relationship with customers is the key of success for a business." Do you agree with the statement ? Discuss different marketing strategies to build and maintain long-term relationship with customers. 10

''एक व्यवसाय के लिए ग्राहकों के साथ विपणन के दीर्घकालिक संबंध बनाना सफलता की कुंजी है।'' क्या आप इस कथन से सहमत हैं ? ग्राहकों के साथ दीर्घकालिक संबंध बनाने और बनाए रखने के लिए विभिन्न रणनीतियों की विवेचना कीजिए।

5. Discuss in detail the Product Mix and Product Line Strategies that are commonly used by Indian Business Houses ? 10

भारतीय व्यावसायिक घरानों द्वारा संयुक्त उत्पाद और उत्पाद लाइन रणनीतियाँ आम तौर पर उपयोग की जाती हैं, इसकी विस्तार से चर्चा कीजिए।

6. Define sales promotion. Discuss various tools of sales promotion generally used now-a-days with the help of suitable examples. 10

बिक्री प्रोत्साहन को परिभाषित कीजिए। बिक्री के प्रचार के विभिन्न साधनों की जो आमतौर पर आजकल उपयोग किए जाते हैं की उपयुक्त उदाहरणों की सहायता से विवेचना कीजिए।

7. What are different social, ethical and legal aspects of Marketing ? Discuss. 10

विपणन के विभिन्न सामाजिक, नैतिक और कानूनी पहलु क्या हैं ? चर्चा कीजिए।

7. What do you mean by cloud computing? Explain its advantages and limitations.

क्लाउड कंप्यूटिंग से आपका क्या अर्थ है? इसके लाभों तथा सीमाओं को समझाइए।

8. Write short notes on the following :

(a) Open source software.

(b) Ethernet.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(क) ओपन सोर्स सॉफ्टवेयर।

(ख) इथरनेट।

Roll No. ..... Total Pages : 4

MDE/D-17 **10285**

FUNDAMENTALS OF INFORMATION TECHNOLOGY

Paper : MCIT-105

Time : Three Hours] [Maximum Marks : 80

Note : Attempt any *five* questions. Q. No. 1 is compulsory.

नोट : किन्हीं **पाँच** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 अनिवार्य है।

1. Compulsory Question (अनिवार्य प्रश्न)

(a) Draw the basic organization of a computer.

(b) What is High Level Language?

(c) What software links machine language with application software?

(d) Is pen drive an input device or storage device?

(e) What is utility software?

(f) Name the layer of TCP/IP protocol.

(g) What are some of the peripheral devices used in computers?

(h) What open source operating systems are available for the users?

(i) Differentiate between intranet and internet.

(j) What is a public cloud? (4×10=40)

(क) एक कंप्यूटर की मूल संरचना का चित्र बनाइए।

(ख) हाई-लेबल लैंग्वेज क्या है?

(ग) कौन-सा सॉफ्टवेयर मशीन लैंग्वेज को एप्लीकेशन सॉफ्टवेयर के साथ जोड़ता है?

(घ) पेन ड्राइव इनपुट उपकरण है या स्टोरेज उपकरण?

(ङ) यूटिलिटी सॉफ्टवेयर क्या है?

(च) टी.सी.पी./आई.पी. (ICP/IP) प्रोटोकॉल के लेयर का नाम बताइए।

(छ) कंप्यूटरों में प्रयुक्त कुछ द्वितीयक उपकरण क्या हैं?

(ज) यूजर्स के लिए कौन-से ओपन-सोर्स ऑपरेटिंग सिस्टम उपलब्ध हैं?

(झ) इंट्रानेट तथा इंटरनेट के बीच अंतर बताइए।

(ञ) पब्लिक क्लाउड क्या है?

2. How has information technology made outsourcing of services possible? Explain its advantages and disadvantages.

सूचना तकनीक ने सेवाओं की आउटसोर्सिंग को कैसे संभव बना दिया है? इसके लाभों एवं हानियों को समझाइए।

3. Explain the following :

(a) RAM.

(b) ROM.

(c) Bubble memory.

(d) Register.

निम्नलिखित को समझाइए :

(क) RAM

(ख) ROM

(ग) बबल मैमोरी।

(घ) रजिस्टर।

4. Define software and explain some of the operating systems used in computers. What role do the operating systems play in a computer?

सॉफ्टवेयर को परिभाषित कीजिए तथा कंप्यूटरों में इस्तेमाल होने वाले कुछ ऑपरेटिंग सिस्टम को समझाइए। एक कंप्यूटर में आपरेटिंग सिस्टम क्या भूमिका निभाता है?

5. Differentiate between OSI and TCP/IP protocols. What is the function of each of the layers of these protocols?

ओ.एस.आई. (OSI) तथा टी.सी.पी./आई.पी. (TCP/IP) प्रोटोकाल के बीच अंतर बताइए। इन प्रोटोकाल की प्रत्येक लेयर का क्या कार्य है?

6. Explain some of the topologies used for networking of computers. What are the considerations in choice of these topologies?

कंप्यूटरों की नेटवर्किंग में इस्तेमाल होने वाली कुछ टोपोलॉजी को समझाइए। इन टोपोलॉजी के चयन में क्या निर्धारक होते हैं?

Roll No. ..... Total Pages : 3

MDE/D-17 **10286**

INTERNET AND MIS

Paper–MCIT-106

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory.

नोट : कुल **पाँच** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 अनिवार्य है।

1. Compulsory Question (अनिवार्य प्रश्न)

Explain the following :

(a) Domain Name System. 4

(b) WAIS. 4

(c) Internet. 4

(d) System. 4

(e) WWW. 4

(f) URL. 4

(g) DSS. 4

(h) Documentation. 4

(i) Firewall. 4

(j) HTTP. 4

निम्नलिखित को समझाइए :

(क) डोमेन नाम प्रणाली।

(ख) डब्ल्यू.ए.आई.एस.।

(ग) इंटरनेट।

(घ) सिस्टम।

(ङ) डब्ल्यू डब्ल्यू डब्ल्यू।

(च) यू.आर.एल.।

(छ) डी.एस.एस.।

(ज) प्रलेखन।

(झ) फायर वॉल।

(ञ) एच.टी.टी.पी.।

2. What do you mean by Internet ? Explain major advantages of internet. How internet works ? Explain. 10

इंटरनेट से आपका क्या तात्पर्य है? इंटरनेट के मुख्य लाभों को समझाइए। इंटरनेट किस प्रकार काम करता है? समझाइए।

3. Can MIS be helpful in information organization ? Discuss. 10

क्या सूचना संयोजन में एम.आई.एस. (MIS) सहायक हो सकता है? चर्चा कीजिए।

4. What is meant by design specification ? Discuss various phases involved in preparing design specifications. 10

डिजायन विनिर्देश का क्या अर्थ है? डिजायन विनिर्देश बनाने में शामिल विभिन्न चरणों की चर्चा कीजिए।

5. What is search engine ? How search engine works ? Discuss various types of SEO techniques. 10

एक सर्च इंजन क्या है? सर्च इंजन किस प्रकार काम करता है? विभिन्न प्रकार के एस.ई.ओ. (SEO) तकनीकों की चचा कीजिए।

6. What do you mean by system testing ? Discuss various types of system tests. 10

सिस्टम टेस्टिंग से आपका क्या तात्पर्य है? सिस्टम टेस्ट के विभिन्न प्रकारों की चर्चा कीजिए।

7. What is an e-mail ? Explain the working of sending and receiving an e-mail. 10

एक ई-मेल (e-mail) क्या है? एक ई-मेल (e-mail) भेजने तथा प्राप्त करने की कार्यप्रणाली को समझाइए।

8. What do you mean by electronic/virtual meetings ? Discuss various tools with the help of which electronic/virtual meetings can be held ? 10

इलेक्ट्रॉनिक/वर्चुअल मीटिंग से आपका क्या तात्पर्य है? उन विभिन्न उपकरणों की चर्चा कीजिए जिनसे इलेक्ट्रॉनिक/वर्चुअल मीटिंग की जा सकेगी।

8. Write a comprehensive note on latest Mutual fund schemes in India. 10

भारत में नवीनतम म्यूचुअल फंड योजनाओं पर एक व्यापक टिप्पणी लिखिए।

Roll No. ..... Total Pages : 4

MDQ/D-17 **10287**

FINANCIAL INSTITUTIONS AND MARKETS

Paper : MCIT-301

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Attempt any *four* questions from the ramaining seven questions.

नोट : कुल **पाँच** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या **एक** अनिवार्य है। बाकी के **चार** प्रश्न बचे हुए सात प्रश्नों में से कीजिए।

1. Compulsory Question (अनिवार्य प्रश्न)

Attempt all the following questions in brief :

(a) What are the constituents of a financial system ?

(b) Differentiate between Money market and Capital market.

(c) State the objectives for setting up SEBI.

(d) What do you mean by Secondary market ?

(e) State the need of Development banks.

(f) What is Merchant banking ?

(g) Discuss the types of Mutual funds.

(h) Explain IFCI.

(i) Discuss the importance of Govt. Securities Market.

(j) Explain the functions of Regional Rural Banks.

(10×4=40)

निम्नलिखित प्रश्नों के संक्षेप में उत्तर दीजिए :

(क) एक वित्तीय प्रणाली के घटक क्या हैं?

(ख) मुद्रा बाजार और पूंजी बाजार के बीच अन्तर कीजिए।

(ग) सेबी (SEBI) की स्थापना के उद्देश्य बताइए।

(घ) द्वितीयक बाजार से आपका क्या तात्पर्य है?

(ङ) विकासशील बैंकों की आवश्यकता बताइए।

(च) व्यापारी बैंकिंग क्या है?

(छ) म्यूचुअल फंड के प्रकारों पर चर्चा कीजिए।

(ज) IFCI की व्याख्या कीजिए।

(झ) सरकारी प्रतिभूति बाजार के महत्त्व की विवेचना कीजिए।

(ञ) क्षेत्रीय ग्रामीण बैंकों के कार्यों की व्याख्या कीजिए।

2. Discuss the role of Financial system in Economic development. Give an overview of Financial system. 10

आर्थिक विकास में वित्तीय प्रणाली की भूमिका पर चर्चा कीजिए। वित्तीय प्रणाली का पर्यावलोकन कीजिए।

3. Differentiate between Primary and Secondary market. Discuss the recent developments in Indian Capital market. 10

प्राथमिक और द्वितीयक बाजार के बीच अन्तर कीजिए। भारतीय पूंजी बाजार में हाल में हुए विकास की विवेचना कीजिए।

4. What are the main functions of Development banks ? Describe the promotional activities of IDBI. 10

विकास बैंकों के मुख्य कार्य क्या हैं? आई.डी.बी.आई. की प्रोत्साहनपरक गतिविधियों का वर्णन कीजिए।

5. What is State Financial Corporation ? Discuss the importance and functions performed by State Industrial Development Corporations. 10

राज्य वित्तीय निगम क्या है? राज्य औद्योगिक विकास निगमों द्वारा किए गए महत्त्वपूर्ण कार्यों की विवेचना कीजिए।

6. Explain the role of Merchant bankers in the Corporate enterprise. Discuss the policy of the Govt. towards Merchant banking in India. 10

कॉर्पोरेट उद्यम में मर्चेन्ट बैंकरों की भूमिका की व्याख्या कीजिए। भारत में मर्चेन्ट बैंकिंग की दिशा में सरकारी नीतियों पर चर्चा कीजिए।

7. What do you mean by "Mutual Fund" ? Discuss its advantages. What problems are faced by Mutual fund investors in India ? 10

म्यूचुअल फंड से आपका क्या तात्पर्य है? इसके फायदों पर चर्चा कीजिए। भारत में म्यूचुअल फंड निवेशकों द्वारा सामना की जाने वाली समस्याएँ क्या हैं?

8. State and explain the following :

(a) Economic analysis for Stock investing.

(b) Moving Average Convergence and Divergence (MACD) for Stock investing. (5+5=10)

निम्नलिखित का उल्लेख और व्याख्या कीजिए :

(क) शेयर निवेश के लिए आर्थिक विश्लेषण।

(ख) शेयर निवेश के लिए औसत अभिसरण और विचलन गतिमान (MACD).

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MDQ/D-17 **10288**

SECURITY ANALYSIS AND
INVESTMENT MANAGEMENT
Paper : MCIT-302

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory and carries 40 marks while Question Nos. 2 to 8 carry 10 marks each.

नोट : कुल **पाँच** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या **एक** अनिवार्य है और 40 अंक का है जबकि प्रश्न 2 से प्रश्न 8 तक प्रत्येक प्रश्न 10 अंक का है।

1. Compulsory Question (अनिवार्य प्रश्न)

Explain the following :

(a) Investment Process.

(b) Systematic Risk.

(c) Primary Market.

(d) Dow Theory.

(e) Linkages of Primary and Secondary markets.

(f) Valuation of Bonds.

(g) Foreign Exchange Risk.

(h) Elliott Wave Theory.

(i) Stock Market Anomalies.

(j) Behvioural Finance. (10×4=40)

निम्नलिखित को स्पष्ट कीजिए :

(क) निवेश प्रक्रिया।

(ख) व्यवस्थित जोखिम।

(ग) प्राथमिक बाजार।

(घ) डॉव सिद्धान्त।

(ङ) प्राथमिक और द्वितीयक बाजारों का संबंध।

(च) बाण्ड का मूल्यांकन।

(छ) विदेशी मुद्रा जोखिम।

(ज) इलियट का वेब सिद्धान्त।

(झ) शेयर बाजार विसंगतियाँ।

(ञ) व्यवहारवादी वित्त।

2. What do you understand by Investment analysis ? Describe approaches to Investment analysis. (5+5=10)

निवेश विश्लेषण से आप क्या समझते हैं? निवेश विश्लेषण के उपागमों का वर्णन कीजिए।

3. What do you mean by Public issue of Securities ? Also describe SEBI guidelines in this regard. (5+5=10)

प्रतिभूतियों के सार्वजनिक निर्गम से आपका क्या तात्पर्य है? इस सम्बन्ध में सेबी के दिशा-निर्देशों का भी वर्णन कीजिए।

4. Describe Stock trading mechanism in India. How are securities listed on Exchanges ? Explain. (5+5=10)

भारत में शेयर ट्रेडिंग क्रियाविधि का वर्णन कीजिए। शेयर बाजार में प्रतिभूतियाँ सूचीबद्ध कैसे होती हैं? व्याख्या कीजिए।

5. What do you understand by the Efficient Market Hypothesis (EMH) ? Describe its forms and the tests for weak form. (5+5=10)

कुशल बाजार परिकल्पना से आपका क्या तात्पर्य है? इसकी रचना और कमजोर रचना के लिए परीक्षण का वर्णन कीजिए।

6. Write notes on the following :

(a) Valuation of Equity shares.

(b) Company Analysis. (5+5=10)

निम्नलिखित पर टिप्पणियाँ लिखिए :

(क) इक्विटी शेयरों का मूल्यांकन।

(ख) कंपनी विश्लेषण।

7. State and differentiate between the Fundamental and Technical analysis for investing in stocks. Are these analytical perspectives complementary or competitive ? Explain. (5+5=10)

शेयरों में निवेश करने के लिए मौलिक तथा तकनीकी विश्लेषण के बीच अन्तर बताइए। ये विश्लेषणात्मक दृष्टिकोण एक-दूसरे के पूरक हैं अथवा प्रतिस्पर्धी हैं? व्याख्या कीजिए।

7. Define Inventory Control. Discuss objectives and Functions of Inventory Control.

इन्वेंट्री नियंत्रण को परिभाषित कीजिए। इन्वेंट्री नियन्त्रण के उद्देश्य और कार्यों की विवेचना कीजिए।

8. Write notes on :

(a) EOQ under Fluctuating Demand.

(b) EOQ under Quantity Discounts.

निम्नलिखित पर नोट लिखिए :

(क) अस्थिर मांग के तहत EOQ.

(ख) मात्रा छूट के तहत EOQ.

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MDQ/D-17 **10289**

OPERATIONS MANAGEMENT

Paper–MCIT–303

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory and consists of 10 short questions having 4 marks each. Answer to these questions should not exceed half page. The candidates are required to attempt any *four* questions out of remaining *seven* questions and each question carry 10 marks.

नोट : कुल **पाँच** प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 अनिवार्य है। जिसमें 10 लघूतरीय प्रश्न शामिल हैं, प्रत्येक प्रश्न 4 अंक का है। इन प्रश्नों का उत्तर आधे पृष्ठ से अधिक नहीं होना चाहिए। बाकी के **चार** प्रश्न बचे हुए **सात** प्रश्नों में से कीजिए। प्रत्येक प्रश्न 10 अंक का है।

Compulsory Question (अनिवार्य प्रश्न)

1. Write short answer of the following. Each question carries 4 marks :

(a) Explain Characteristics of Manufacturing Systems.

(b) Discuss Product Planning and Design.

(c) Describe Plant Location.

(d) Explain Capacity Planning and its Procedure.

(e) Discuss Inventory Management.

(f) Explain Inventory Cost Concept.

(g) Discuss Developing New Products.

(h) Explain Statistical Quality Control.

(i) Explain PERT.

(j) Explain Fixed Order Cycle (FOC) System.

निम्नलिखित के संक्षिप्त उत्तर दीजिए। प्रत्येक प्रश्न 4 अंक का है।

(क) विनिर्माण प्रणाली की विशेषताओं की व्याख्या कीजिए।

(ख) उत्पाद योजना और डिजाइन की विवेचना कीजिए।

(ग) संयंत्र स्थापना का वर्णन कीजिए।

(घ) क्षमता नियोजन और इसकी प्रक्रिया की व्याख्या कीजिए।

(ङ) इन्वेंट्री प्रबंधन की विवेचना कीजिए।

(च) इन्वेंट्री लागत अवधारणा की व्याख्या कीजिए।

(छ) नए उत्पादों के विकास पर चर्चा कीजिए।

(ज) सांख्यिकीय गुणवत्ता नियंत्रण की व्याख्या कीजिए।

(झ) पी.ई.आर.टी. पर चर्चा कीजिए।

(ञ) निश्चित क्रम चक्र प्रणाली की व्याख्या कीजिए।

2. Define Plant Layout. Discuss, in detail, Plant Layout Models.

संयंत्र लेआउट को परिभाषित कीजिए। संयंत्र लेआउट के मॉडल की विस्तार में चर्चा कीजिए।

3. Write notes on :

(a) Assembly Line Balancing.

(b) Forecasting Errors.

निम्न पर टिप्पणी लिखिए :

(क) असंबली लाइन संतुलन।

(ख) पूर्वानुमान त्रुटियां।

4. Define Material Requirements Planning. Explain its Benefits and Disadvantages.

सामग्री जरूरत योजना को परिभाषित कीजिए। इसके लाभ और हानियों की व्याख्या कीजिए।

5. Explain the following :

(a) Scope and Objectives of Inventory Control.

(b) Scheduling.

निम्नलिखित की व्याख्या कीजिए :

(क) इन्वेंट्री नियंत्रण का क्षेत्र और उद्देश्य।

(ख) क्रमादेशन।

6. Discuss the following :

(a) Scheduling Jobs on Machines.

(b) Application of OR Techniques to Operations Management.

निम्नलिखित की चर्चा कीजिए :

(क) मशीन पर अनुसूचित कार्य।

(ख) संचालन प्रबंधन के लिए 'ओर' (OR) तकनीकी की उपयोगिता।

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MDQ/D-17 **10290**

ADVERTISING MANAGEMENT

Paper : MCIT-304

Time : Three Hours] [Maximum Marks : 80

Note : First question is compulsory. Attempt any *four* more questions out of the remaining *seven* questions.

1. Compulsory Question :

Answer the following short answer type questions :

(a) Difference between Advertising and Publicity.

(b) Can advertising create monopoly conditions ?

(c) Explain impact of advertising on consumer choice.

(d) What are advertising objectives ?

(e) What is advertising budget ?

(f) What is outdoor advertising ?

(g) What is fear appeal ?

(h) What is media planning ?

(i) What is media scheduling ?

(j) What is an advertising agency ? (10×4=40)

2. Explain the meaning, features and importance of advertising. 10

3. Critically examine various types of advertising. Give reasons for increasing popularity of Internet advertising. 10

4. (a) Does advertising affect cultural values of a society ?

(b) Are there ethics and truth in advertising ? 10

5. Critically examine different methods of preparing advertising budget. Which method is considered as the most appropriate and why ? 10

6. What is advertising appeal ? Explain its various types with examples. 10

7. Explain the meaning, importance and problems in media planning. 10

8. What is advertising effectiveness ? Explain various Pre-testing and Post-testing methods of advertising effectiveness. 10

6. Create a table student {rollno, name, date_admission, deptno} and College {deptno, deptname, location} then add foreign key {deptno) to student table. 10
एक तालिका छात्र {रोलनंबर, नाम, दाखिला तारीख, विभागसंख्या} तथा कालेज {विभागसंख्या, विभागनाम, स्थान} बनाइए, तब छात्र तालिका के फॉरन की (Foreign Key) से जोड़िए।

7. What is cursor and copy all the data of one table to another table using cursor. 10
कर्सर (Cursor) क्या होता है तथा कर्सर के उपयोग द्वारा एक तालिका के डाटा को दूसरी तालिका में कॉपी कीजिए।

8. What do you mean by join. Write a query of displaying inner join. outer join of any *two* tables in SQL. 10
जॉइन (Join) से आपका क्या अर्थ है ? एस.क्यू.एल. (SQL) में किन्हीं **दो** तालिकाओं को इनर जॉइन, आउटर जॉइन डिस्प्ले करने की क्वैरी (Query) लिखिए।

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MDQ/D-17

VISUAL BASIC AND SQL
Paper : MCIT-305

Time : Three Hours] [Maximum Marks : 80

Note : Question No. 1 is compulsory. Attempt any *four* questions from remaining seven questions.

नोट : प्रश्न संख्या 1 अनिवार्य है। शेष सात प्रश्नों में से किन्हीं **चार** प्रश्नों के उत्तर दीजिए। सभी प्रश्नों के अंक समान हैं।

1. Compulsory Question (अनिवार्य प्रश्न)

(i) What do you mean by Event Driven Programming. Write syntax for handling a Mouse.
घटना संचालित प्रोग्रामिंग (Event Driven Programming) से आपका क्या अर्थ है ? माउस को हैंडिल करने के लिए सिन्टेक्स लिखिए।

(ii) What is use of image box and add a picture to it to a form.
इमेज बॉक्स (Image Box) का क्या उपयोग है तथा इसके फार्म में एक चित्र जोड़िये।

(iii) Write a steps to add combo box and list box to the form and add three name to combo box and list box.
फार्म में कोम्बो बॉक्स तथा लिस्ट बॉक्स को जोड़ने के चरण लिखिए तथा कोम्बो बॉक्स व लिस्ट बॉक्स में तीन नाम जोड़िये।

(iv) What is structure of WHILE loop and add first ten number [1....10].

व्हील लूप (WHILE loop) की क्या संरचना है तथा प्रथम दस अंक जोड़िए [1....10]।

(v) What is difference between table and view. Also the advantage of View.

टेबल (Table) तथा व्यू (View) के बीच क्या अन्तर है ? व्यू (View) के लाभों को भी बताइए।

(vi) Write a function to swap two number.

दो अंकों को आपस में बदलने के लिए फलन लिखिए।

(vii) What is key. Write a query to add primary key to the existing table.

'की' (Key) क्या है ? मौजूदा तालिका में प्राइमरी 'की' को जोड़ने के लिए क्वैरी (Query) लिखिए।

(viii) Write a query to create table about student and insert data into this table.

छात्र के बारे में टेबल बनाने के लिए एक क्वैरी (Query) लिखिए तथा इस टेबल में डाटा प्रविष्ट कीजिए।

(ix) What is the application of trigger.

ट्रिगर (Trigger) का क्या अनुप्रयोग है ?

(x) What is cursor. What is use of cursor data type and their declaration. (4×10=40)

कर्सर (Cursor) क्या होता है ? कर्सर डाटा प्रकार का क्या उपयोग है तथा उनकी घोषणा का क्या उपयोग है ?

2. Design a form and add text box for first number and another text box for second number and add submit button and clear button. When you press submit button then display message of the result of add these two number. 10

एक फार्म को डिजायन कीजिए तथा पहले अंक के लिए टेक्स्ट बॉक्स तथा दूसरे अंक के लिए एक अन्य टेक्स्ट बॉक्स जोड़िए तथा सबमिट (Submit) व क्लियर (Clear) बटन जोड़िए। जब आप सबमिट (Submit) बटन दबाते हैं तब इन दो अंकों के योग के परिणाम को डिस्प्ले (Display) कीजिए।

3. Write a program to find the smallest of three number using if-else. 10

अन्यथा (if-else) के उपयोग द्वारा तीन अंकों में सबसे छोटे को ज्ञात करने के लिए एक प्रोग्राम लिखिए।

4. What do you mean by Array data type. Write a program to add two metrics of M × N order. 10

सरणी (Array) डाटा टाइप से आपका क्या अर्थ है ? M × N कोटि के दो आव्यूहों को जोड़ने के लिए एक प्रोग्राम लिखिए।

5. Write a program to find factorial of any number using WHILE loop. 10

व्हाइल लूप (WHILE loop) के उपयोग द्वारा किसी संख्या के क्रमगुणित को ज्ञात करने के लिए एक प्रोग्राम लिखिए।

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DATA BASE MANAGEMENT SYSTEM

Paper : MCIT-306

Time : Three Hours]

[Maximum Marks : 80

Note : Question No. 1 is compulsory. Attempt any *four* question out of remaining *seven* questions.

1. Compulsory Question

(a) What is DBA and what are the responsibility of DBA ? 4

(b) What is advantages of RDBMS over DBMS ? 4

(c) What is entity types and also write the difference between value set and attribute ? 4

(d) What is Foreign key and Candidate key. Explain it with the help of example ? 4

(e) What is codasyl DBTG model ? Explain its applications. 4

(f) What is Data model and explain Hierarchical Data model ? 4

(g) What is a Record and explain Virtual record. 4

(h) Write the Union and Intersect algebraic operations on data. 4

(i) Explain the Select algebra Operation with example. 4

(j) Write query in relational calculus to find the branch-name, loan number, customer name to those whose amount for loans over Rs. 1200. 4

2. Explain the 3-Tier Architecture system in DBMS. 10

3. What is the advantages of DBMS and also define instance and schema ? 10

4. What are Constraints? Explain the different types of constraints used in DBMS. 10

5. What is ER model and write the symbol of attributes, key attributes, relationship between them ? 10

6. What is Network Model and explain it with example ? 10

7. (a) What is the difference between tuple relational calculus and domain relational calculus?

(b) Write any *two* rules of Codd. 10

8. What is data integrity? Explain the types of integrity constraints. 10