

UPPSC-AE

UTTAR PRADESH PUBLIC SERVICE COMMISSION

Combined State Engineering
Services Examination

Assistant Engineer

Civil Engineering

Previous Years Solved Papers

Objective Papers

General Hindi

General Studies

Practice Questions



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UPPSC-AE : Civil Engineering Previous Solved Papers

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Preface

UPPSC Assistant Engineer Examination has been always preferred by Engineers due to job stability and opportunity to work in home state. UPPSC Combined State Engineering Services examination is conducted time to time but not every year. MADE EASY team has made deep study of previous exam papers and observed that a good percentage of questions are of repetitive in nature, therefore previous year's papers are advisable to solve before a candidate takes the exam. This book is also useful for MP State Engineering Services, UPSC Engineering Services and other Competitive exams for Engineering graduates.



B. Singh (Ex. IES)

The current edition of this book contains complete solutions to all questions with accuracy. I have true desire to serve student community by providing good source of study and quality guidance. I hope this book will be proved an important tool to succeed in UPPSC and other competitive exams. Any suggestions from the readers for improvement of this book are most welcome.

With Best Wishes

B. Singh

CMD, MADE EASY

UPPSC : Exam Pattern

Combined State Engineering Services Examination Assistant Engineer examination

Paper I : Objective Maximum Time : 2½ Hours • Maximum Marks : 375 Each question carries 3 marks. There is a penalty of –1 mark for every wrong attempted answer	
General Hindi	25 Questions
Technical Paper I	100 Questions
Total	125 Questions (375 Marks)

Paper II : Objective Maximum Time : 2½ Hours • Maximum Marks : 375 Each question carries 3 marks. There is a penalty of –1 mark for every wrong attempted answer	
General Studies	25 Questions
Technical Paper II	100 Questions
Total	125 Questions (375 Marks)

Uttar Pradesh Public Service Commission

Combined State Engineering Services Examination

Assistant Engineer

Civil Engineering

Paper-I (Part A)

Engineering Mechanics, Strength of Materials and Structural Analysis:

Units and Dimensions, SI units, vectors, concept of force, Concept of particle and rigid body Concurrent, Non- Concurrent and parallel forces in a plane, moment of force and varignon's theorem free body diagram, conditions of equilibrium Principle of virtual work, equivalent force system. First and second Moment of area, Mass moment of inertia, Static Friction, inclined plane and bearings, kinematics and kinetics, kinematics in Cartesian and Polar Coordinates, motion under uniform and non-uniform acceleration, motion under gravity, Kinetics of particle: Momentum and Energy principles, D' Alembert's principle, Collision of elastic bodies, rotation of rigid, bodies, simple harmonic motion.

Strength of Materials:

Simple Stress and Strain, Elastic constants, axially loaded compression members, Shear force and bending moment, theory of simple bending, bending stress, Shear Stress, Beams of uniform strength, Leaf Spring, close coiled helical springs, Strain Energy in direct stress, bending & shear. Deflection of beams; Macaulay's method, Mohr's Moment area method, Conjugate beam method, unit load method, Torsion of shafts, Transmission of power, Elastic stability of columns, Euler's Rankin's and Secant formulae. Principal stresses and strains in two dimensions, Mohr's Circle, Theories of Elastic Failure, Thin and Thick cylinder, Stresses due to internal and external pressure- Lamé's equations.

Structural Analysis :

Castigliano's theorems I and II, Unit load method of consistent deformation applied to beams and pin jointed trusses. Slope-deflection, moment distribution, Kani's method of analysis and column Analogy method applied to indeterminate beams and rigid frames. Rolling loads and influence lines: Influence lines for reactions of beam, shear force and bending moment at a section of beam. Criteria for maximum shear force and bending moment in beams traversed by a system of moving loads, influence lines for simply supported plane pin jointed trusses, Arches: Three hinged, two hinged and fixed arches, rib shortening and temperature effects, influence lines in arches, Matrix methods of analysis: Force method and displacement method of analysis of indeterminate beams and rigid frames. Plastic Analysis of beams and frames: Theory of plastic bending, plastic analysis, statical method, Mechanism method. Unsymmetrical bending: Moment of inertia, product of inertia, position of neutral axis and principal axis, calculation of bending stresses.

(Part B)

Design of Structures: Steel, Concrete and Masonry Structures

Structural Steel Design:

Factors of safety and load factors, rivetted, bolted and welded joints and its connections, Design by working, stress/limit state method of tension and compression member, beams of built up section, rivetted and welded plate girders, gantry girders, stanchions with battens and lacing, slab and gusseted column bases, Design of highway and railway bridges: Through and deck type plate girder, Warren girder, Pratt truss.

Design of Concrete and Masonry Structures

Reinforced Concrete:

Working Stress and Limit State Method of design-Recommendations of B.I.S. codes, design of one way and two way slabs, stairs-case slabs, simple and continuous beams of rectangular, T and L sections, compression members under direct load with or without eccentricity, isolated and combined footings, Cantilever

and counter-fort type retaining walls, Water tanks: Design requirements as per B.I.S. code for rectangular and circular tanks resting on ground, Prestressed concrete: Methods and systems of prestressing, anchorages, analysis and design of sections for flexure based on working stress, losses of prestress, Earth quake resistant design of building as per BIS code. Design of brick masonry as per I. S. Codes, Design of masonry retaining walls.

(Part C)

Building Materials, Construction Technology, Planning and Management

Building Materials:

Physical properties of construction materials with respect to their use: stones bricks, tiles, lime, glass, cement, mortars, Concrete, concept of mix design, pozzolans, plasticizers, super plasticizers, Special concrete: roller compacted concrete, mass concrete, self compacting concrete, ferro cement, fibre reinforced concrete, high strength concrete, high performance concrete, Timber: properties, defects and common preservation treatments, Use and selection of materials for various uses e.g. Low cost housing, mass housing, high rise buildings.

Constructions Technology, Planning and Management:

Masonry constructions using brick, stone, construction detailing and strength characteristics paints, varnishes, plastics, water proofing and damp proofing materials. Detailing of walls, floors, roofs, staircases, doors and windows. Plastering, pointing, flooring, roofing and construction features. Retrofitting of buildings, Principle of planning of building for residents and specific uses, National Building code provisions and uses. Basic principles of detailed and approximate estimating, specifications, rate analysis, principles of valuation of real property. Machinery for earthwork, concreting and their specific uses, factors affecting selection of construction equipments, operating cost of equipments. Construction activity, schedules, organizations, quality assurance principles. Basic principle of network CPM and PERT uses in construction monitoring, cost optimization and resource allocation. Basic principles of economic analysis and methods. Project profitability: Basis principles of financial planning, simple toll fixation criterions.

Geo Technical Engineering and Foundation Engineering

Types of soils, phase relationships, consistency limits particles size distribution, classifications of soils, structure and clay mineralogy. Capillary water, effective stress and pore water pressure, Darcy's Law, factors affecting permeability, determination of permeability, permeability of stratified soil deposits. Seepage pressure, quick sand condition, compressibility and consolidation, Terzaghi's theory of one dimensional consolidation, consolidation test. Compaction of soil, field control of compaction total stress and effective stress parameters, pore pressure parameters, shear strength of soils, Mohr Coulomb failure theory, shear tests.

Earth pressure at rest, active and passive pressures, Rankin's theory Coulomb's wedge theory, Graphical method of earth pressure on retaining wall, sheetpile walls, braced excavation, bearing capacity, Terzaghi and other important theories, net and gross bearing pressure. Immediate and consolidation settlement, stability of slope, total stress and effective stress methods, conventional methods of slices, stability number. Subsurface exploration, methods of boring, sampling, penetration tests, pressure meter tests, essential features of foundation, types of foundation, design criteria, choice of type of foundation, stress distribution in soils, Boussinessq's theory, Westergaard method, Newmarks chart, pressure bulb, contact, pressure, applicability of different bearing capacity theories, evaluation of bearing capacity from filed tests, allowable bearing capacity, settlement analysis, allowable settlement, proportioning of footing, isolated and combined footings,

rafts, pile foundation, types of piles, piles capacity, static and dynamic analysis, design of pile groups, pile load test, settlement of piles lateral loads, foundation for bridges, Ground improvement techniques: sand drains, stone columns, grouting, soil stabilization geotextiles and geomembrane, Machine foundation: Natural frequency, design of machine foundations based on the recommendation of B.I.S. codes.

Paper-II (Part A)

Fluid Mechanics, Open Channel Flow, Hydraulic Machines and Hydro-power Engineering

Fluid Mechanics : Fluid properties and their roles in fluid motion, fluid statics including forces acting on plane and curved surfaces, Kinematics and Dynamics of Fluid flow: Velocity and acceleration, stream lines, equation of continuity, irrotational and rotational flow, velocity potential and stream functions, flownet, methods of drawing flownet, source and sink, flow separation, free and forced vortices.

Flow control volume equation, continuity, momentum and energy equations, Navier- Stokes equation, Euler's equation of motion and application to fluid flow problems, pipe flow, plane, curved, stationary and moving vanes sluice gates, weirs, orifice meters and Venturi meters.

Dimensional Analysis and Similitude: Buckingham's Pi-theorem, dimensionless parameters, similitude theory, model laws, undistorted and distorted models.

Laminar flow : Laminar flow between parallel, stationary and moving plates, flow through pipes.

Boundary Layer : Laminar and turbulent boundary layer on a flat plate, laminar sub-layer, smooth and rough boundaries, submerged flow, drag and lift and its applications.

Turbulent flow through pipes : Characteristics of turbulent flow, velocity distribution, pipe friction factor, hydraulic grade line and total energy line, siphons, expansion and contractions in pipes pipe networks, water hammer in pipes and surge tanks.

Open Channel Flow : Flow types, uniform and nonuniform flows, momentum and energy correction factors, Specific energy and specific force, critical depth, resistance equations and roughness coefficient, rapidly varied flow, flow in transitions, Brink flow, Hydraulic jump and its applications, waves and surges, gradually varied flow, classification of surface profiles, control section, Integration of varied flow equation and their solution.

Hydraulic Machines and Hydropower:

Centrifugal pumps-Types, characteristics, Net Positive Suction-head (NPSH), specific speed, Pumps in series and parallel. Reciprocating pumps, Air vessels, Hydraulic ram, efficiency parameters, Rotary and positive displacement pumps, diaphragm and jet pumps.

Hydraulic turbines : types, classification, Choice of turbines, performance parameters, controls, characteristics, specific speed.

Principles of hydropower development : Types, layouts and component works, surge tanks, 'types and choice, Flow duration curves and dependable flow, Storage and pondage, Pumped storage plants, Special types of hydel plants.

(Part B)

Hydrology and Water Resources Engineering

Hydrology: Hydrologic cycle, precipitation, evaporation, transpiration, infiltration, overland flow, hydrographs, flood frequency analysis, flood routing through a reservoir, channel flow routing- Muskingum method.

Ground Water Flow : Specific yield, storage coefficient, coefficient of permeability, confined and unconfined aquifers, radial flow into a well under confined and unconfined conditions, Openwells and tube wells. Ground and surface water recourses single and multipurpose projects, storage capacity of reservoirs, reservoir losses, reservoir sedimentation. Water requirements of crops consumptive use, duty and delta, irrigation methods, Irrigation efficiencies.

Canals : Distribution systems for canal irrigation, canal capacity, canal losses, alignment of main and distributory canals, Design of canal by Kennedy's and Lacey's theories, Water logging and its prevention.

Diversion head works : Components, Principles and design of weirs on permeable and impermeable foundations, Khosla's theory, Bligh's creep theory Storage works. Cross drainage works. Types of dams, design principles of gravity and earth dams, stability analysis. Spillways: Spillway types energy dissipation.

River training : Objectives of river training, methods of river training and bank protection.

(Part C)

Transportation Engineering

Highway Engineering : Principles of Highway alignments, classification and geometric design, elements and standards for roads.

Pavement: flexible and rigid pavements Design principles and methodology. Construction methods and materials for stabilized soil. WBM, Bituminous works and Cement Concrete roads.

Surface and sub-surface drainage arrangements for roads, culvert structures. Pavement distresses and strengthening by overlays. Traffic surveys and their application in traffic planning, Typical design features for channelized, intersection, rotary etc., signal designs, standard traffic signs and markings.

Railway Engineering: Permanent way, ballast, sleeper, chair and fastenings, points, crossings, different types of turn outs, cross-over, setting out of points, Maintenance of track, super elevation, creep of rails ruling gradients, track resistance tractive effort, curve resistance, Station yards and station buildings, platform sidings, turn outs, Signals and interlocking, level crossings.

Air port Engineering : Layouts, Planning and design.

(Part D)

Environmental Engineering

Water supply: Estimation of water demand, impurities in water and their significance, physical, chemical and bacteriological parameters and their analysis, waterborne diseases, standards for potable water.

Water collection & treatment: Intake structures, principles and design of sedimentation tank, coagulation cum flocculation units slow sand filter, rapid sand filter and pressure filter, theory & practices of chlorination, water softening, removal of taste and salinity, Sewerage Systems, Domestic and industrial wastes, storm, sewage, separate and combined systems, flow through sewers, design of sewers.

Waste water characterization: Solids, Dissolved oxygen (DO), BOD COD, TOC, and Nitrogen, Standards for disposal of effluent in normal water course and on to land.

Waste water treatment: Principles and design of wastewater Treatment units-- Screening, grit chamber, sedimentation tank activated sludge process, trickling filters, oxidation ditches, oxidation ponds, septic tank; Treatment and disposal of sludge; recycling of waste water.

Solid waste management: Classification, Collection and disposal of solid waste in rural and urban areas, Principles of solid waste management.

Environmental pollution : Air and water pollution and their control acts. Radioactive waste and their disposal Environmental impact assessment of Thermal power Plants, mines and river valley projects, Sustainable development.

(Part E)

Survey and Engineering Geology

(a) Surveying: Common methods and instruments for distance and angle measurements in Civil Engineering works, their use in plane table traverse survey, levelling, triangulation, contouring and topographical maps. Survey layouts for culverts canal, bridge, roads, railway alignment and buildings.

Basic principles of photogrammetry and remote sensing.

Introduction to Geographical information system.

Engineering Geology : Basic concepts of Engineering geology and its applications in projects such as dams, bridges and tunnels.



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UPPSC-AE

Combined State Engineering
Services Examination

Section-A

Civil Engineering



Objective Previous Years Questions

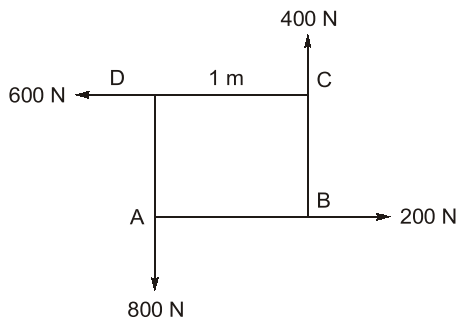
2007 (II)

- Q.1** Moment of Inertia of a triangular cross-section of height d and base width b about its centroid axis parallel to base is

(a) $\frac{bd^3}{36}$ (b) $\frac{bd^3}{24}$
 (c) $\frac{bd^3}{12}$ (d) $\frac{bd^3}{6}$

2019

- Q.2** Four forces having magnitudes of 200 N, 400 N, 600 N and 800 N, respectively acting along four sides (1 m each) of a square ABCD as shown in figure. Determine the magnitude and direction of the resultant force from 'A' along the line 'AB'.



- (a) $400\sqrt{3}$ N, 3.2 m from A
 (b) $400\sqrt{2}$ N, 2.5 m from A
 (c) $300\sqrt{2}$ N, 2 m from A
 (d) $300\sqrt{3}$ N, 2.5 m from A
- Q.3** A bullet of mass 30 gm leaves the barrel of a gun with a velocity of 500 m/s. Suppose, the force lasted, for 0.0018 seconds, the average impulsive force is
- (a) 5333.33 N (b) 6333.33 N
 (c) 7333.33 N (d) 8333.33 N

- Q.4** A particle undergoes a simple harmonic motion, the acceleration of the particle at a distance of 1.5 m from the centre of motion being 6 m/s^2 , the time of oscillation in seconds is

(a) 2.00 (b) 4.00
 (c) 3.14 (d) 6.28

- Q.5** The coefficient of friction is the ratio of
- (a) Limiting friction force to the normal reaction
 (b) Limiting friction force to the weight of body to be moved
 (c) Sliding friction force to the normal reaction
 (d) None of the above

- Q.6** The D'Alembert principle
- (a) is a hypothetical principle
 (b) provides no special advantage over Newton's law
 (c) is based upon the existence of inertia force
 (d) allows a dynamical problem to be considered as a static problem

2021

- Q.7** Which theorem/principle may be stated as the net external forces acting on the system and the resultant reversed effective forces (internal force) are in equilibrium?
- (a) Lami's theorem
 (b) Varignon's theorem
 (c) D'Alembert's principle
 (d) None of the above
- Q.8** If a particle is moving with simple harmonic motion, the velocity is ____ at the mean position.
- (a) Maximum (b) Zero
 (c) Minimum (d) None of these

Q.9 The ratio of distance moved by effort to distance moved by load is called

- (a) Resistance of machine
- (b) Mechanical advantage
- (c) Effect ratio
- (d) Velocity ratio

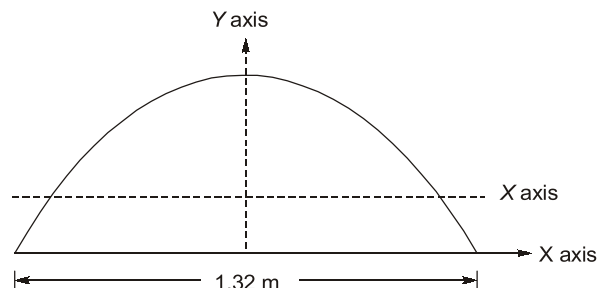
Q.10 The forces which meet at one point, but their line of action do not lie in a plane are called

- (a) Intersecting forces
- (b) Coplanar non-concurrent forces
- (c) Non-coplanar non-concurrent forces
- (d) Non-coplanar concurrent forces

Q.11 Ball A of mass 2 kg moving with a velocity of 2 m/s, strikes directly on a ball B of mass 4 kg at rest. The ball A, after striking comes to rest. Find the coefficient of restitution after the collision.

- (a) 1.00
- (b) 0.5
- (c) 0.67
- (d) 0.33

Q.12 The Y axis of centre of gravity of semicircular plate 1.32 m diameter from its base as shown in figure.



- (a) 0.14 m
- (b) 0.21 m
- (c) 0.28 m
- (d) None of these



Answers | Engineering Mechanics

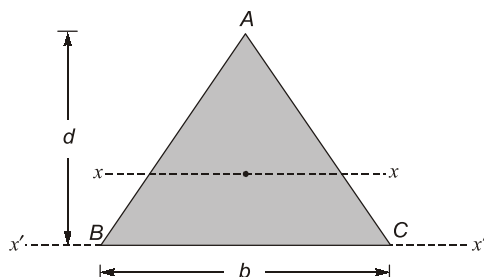
- | | | | | | |
|--------|--------|--------|---------|---------|---------|
| 1. (a) | 2. (b) | 3. (d) | 4. (c) | 5. (a) | 6. (d) |
| 7. (c) | 8. (a) | 9. (d) | 10. (d) | 11. (b) | 12. (c) |



Explanations | Engineering Mechanics

1. (a)

We know that

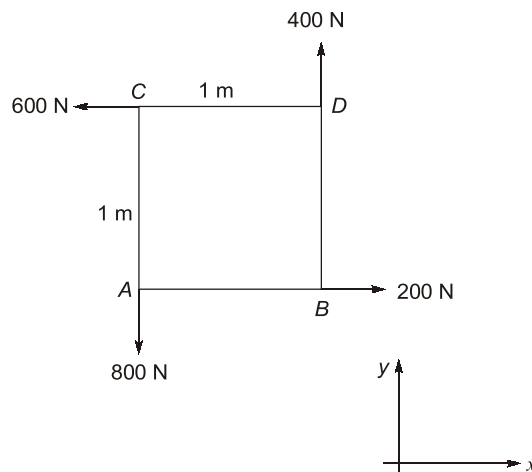


$$I'_x = \frac{bd^3}{12}$$

$$I_x = \frac{bd^3}{36}$$

Hence option (a) is correct.

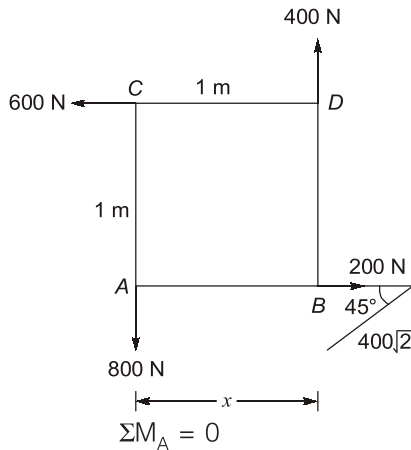
2. (b)



$$\Sigma F_x = -400 \text{ N}$$

$$\Sigma F_y = -400 \text{ N}$$

So resultant force = $400\sqrt{2} \text{ N}$



$$\Sigma M_A = 0$$

$$(400\sqrt{2} \sin 45^\circ)x = 4w + 600$$

$$x = 2.5 \text{ m}$$

3. (d)

Average impulsive force,

$$I = \frac{MW}{dt} = \frac{30 \times 10^{-3} \times 500}{0.0018}$$

$$= 8333.3 \text{ N}$$

4. (c)

$$F = ma$$

Spring force = kx

$$6 \text{ m} = 1.5 k$$

$$k/m = 4$$

Time of oscillation (sec)

$$= 2\pi \left(\sqrt{\frac{m}{k}} \right) = 2\pi \sqrt{\frac{1}{4}}$$

$$= \frac{2\pi}{2} = \pi = 3.14 \text{ sec}$$

5. (a)

$$f = \frac{\text{Limiting friction force}}{\text{Normal reaction}}$$

7. (c)

Lami's theorem relates the magnitudes of three coplanar, concurrent and non-collinear vectors, which keeps an object in static equilibrium, with the angles directly opposite to the corresponding vectors.

Varignon's theorem states that the moment of any force is equal to the algebraic sum of the moments of the components of that force.

D'Alembert's principle states that the net external forces acting on the system and the resultant reversed effective forces are in equilibrium.

8. (a)

At mean position, velocity is maximum and acceleration is 0.

10. (d)

Concurrent → Passing through same point

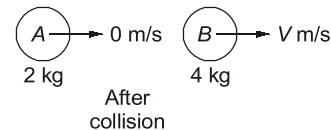
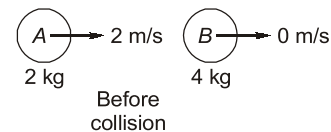
Coplanar → Lying in the same plane

Collinear → Having a common line of action

11. (b)

Coefficient of restitution (e)

$$= \frac{\text{Velocity of Separation}}{\text{Velocity of Approach}}$$



Applying Momentum Conservation:

$$\Rightarrow M_A u_A + M_B u_B = M_A v_A + M_B v_B$$

$$\Rightarrow 2(2) + 4(0) = 2(0) + 4(V)$$

$$\Rightarrow 4 = 4V$$

$$\Rightarrow V = 1 \text{ m/s}$$

$$\text{Now, } e = \frac{v_B - v_A}{u_A - u_B} = \frac{V - 0}{2 - 0} = \frac{1}{2} = 0.5$$

12. (c)

y-co-ordinate of C.G of semi-circle

$$= \frac{4R}{3\pi}$$

$$R = \text{Radius} = \frac{1.32}{2} = 0.66 \text{ m}$$

$$y = \frac{4 \times 0.66}{3\pi} = 0.28 \text{ m}$$



यू.पी.पी.एस.सी.- एई
संयुक्त राज्य अभियांत्रिकी सेवा परीक्षा

Section-B

सामान्य हिन्दी



पिछले वर्षों के वस्तुनिष्ठ प्रश्न

वर्ष 2004 (पेपर)

सामान्य हिन्दी

- Q.1** 'एक तो करेला दूजे नीम चढ़ा' का सही अर्थ निर्देशित कीजिए।
(a) करेला खाये तो नीम पर न चढ़े।
(b) नीम पर चढ़ा करेला कढ़वा होता है।
(c) करेला और नीम दोनों कड़वे होते हैं।
(d) किसी दुर्जन के साहचर्य से दुष्ट व्यक्ति की दुष्टता में और अधिक वृद्धि।
- Q.2** 'गंगा गये गंगादास, जमुना गये जमुनादास' का अर्थ है।
(a) संगम में विधिपूर्वक स्नान करना।
(b) गंगा और यमुना का परम भक्त होना।
(c) अवसरवादी होना।
(d) धार्मिक व्यक्ति होना।
- Q.3** शुद्ध वर्तनी वाला शब्द।
(a) सन्यासी (b) संयासी
(c) सनयासी (d) संन्यासी
- Q.4** शुद्ध शब्द है
(a) उपरोक्त (b) उपरियुक्त
(c) उपर्युक्त (d) उपरिवक्त
- Q.5** निम्नलिखित में कौन सा शब्द पुल्लिङ्ग नहीं है?
(a) घी (b) पानी
(c) मनमानी (d) दानी
- Q.6** उर्दू को 'दूसरी राजभाषा' के रूप में मान्यता है
(a) पश्चिम बंगाल में (b) तमिलनाडू में
(c) उत्तर-प्रदेश में (d) महाराष्ट्र में
- Q.7** 'एक अनार सौ बीमार'
(a) मुहावरा है। (b) कहावत है।
(c) सूक्ति है। (d) कोई नहीं।
- Q.8** समान अर्थ वाला युग्म शब्द है।
(a) कथा—कत्था (b) कड़ाही—कढ़ाई
(c) बेला—बेला (d) नीरज—अम्बुज
- Q.9** अंग्रेजी इन्ट्रो (Intro) शब्द का प्रयोग किस क्षेत्र में किया जाता है?
(a) समाचार लेखन हेतु।
(b) सचिवालय में प्रवेश हेतु।
(c) क्रिकेट टीम में सम्मिलित होने हेतु।
(d) राजकीय सेवा में नियुक्ति हेतु।
- Q.10** 'इन दोनों कमरों एक दीवार है।' रिक्त स्थान की पूर्ति के लिए उपयुक्त शब्द कौन सा है?
(a) मैं (b) के अन्दर
(c) के बीच में (d) के बीच
- Q.11** 'मेरी कन्या का विवाह होने जा रहा है।' वाक्य में रिक्त स्थान की पूर्ति के लिए उपयुक्त शब्द है।
(a) सौभाग्यवती (b) सुहागन
(c) सौभाग्याकांक्षिणी (d) सौभाग्योत्सुक
- Q.12** निम्नलिखित शब्द समूहों में भिन्न अर्थ देने वाला शब्द है
(a) पवन (b) मारुत
(c) अनल (d) समीर
- Q.13** 'संयोग' शब्द का उपयुक्त विलोम है
(a) अयोग (b) वियोग
(c) प्रयोग (d) दुरयोग
- Q.14** 'पत्थर' का तत्सम शब्द है
(a) प्रस्तर (b) पाहन
(c) चट्टान (d) कंक्रीट
- Q.15** निम्नलिखित शब्दों में अव्यय बताइए।
(a) आया (b) किन्तु
(c) नहीं (d) वह
- Q.16** जागृति का विलोम है
(a) प्रगति (b) कान्ति
(c) शान्ति (d) सुषुप्ति
- Q.17** शुद्ध शब्द है
(a) प्रौद्योगिकी (b) प्रौद्योगीकी
(c) प्रौद्योगीकि (d) प्रोद्योगिकी

उत्तरमाला | सामान्य हिन्दी : वर्ष 2004 (पेपर)

1. (d)	16. (d)	31. (d)	46. (b)	61. (a)	76. (a)	91. (b)
2. (c)	17. (a)	32. (c)	47. (d)	62. (a)	77. (b)	92. (d)
3. (d)	18. (a)	33. (c)	48. (a)	63. (c)	78. (d)	93. (c)
4. (c)	19. (d)	34. (b)	49. (a)	64. (a)	79. (a)	94. (a)
5. (c)	20. (a)	35. (c)	50. (d)	65. (b)	80. (c)	95. (b)
6. (c)	21. (d)	36. (c)	51. (b)	66. (d)	81. (d)	96. (c)
7. (b)	22. (c)	37. (d)	52. (c)	67. (d)	82. (d)	97. (d)
8. (d)	23. (*)	38. (b)	53. (b)	68. (d)	83. (b)	98. (d)
9. (a)	24. (b)	39. (b)	54. (a)	69. (c)	84. (d)	99. (c)
10. (c)	25. (c)	40. (a)	55. (a)	70. (c)	85. (c)	100. (c)
11. (c)	26. (b)	41. (d)	56. (d)	71. (d)	86. (c)	
12. (c)	27. (a)	42. (d)	57. (a)	72. (d)	87. (d)	
13. (b)	28. (b)	43. (b)	58. (b)	73. (d)	88. (d)	
14. (a)	29. (a)	44. (d)	59. (d)	74. (a)	89. (d)	
15. (b)	30. (c)	45. (c)	60. (b)	75. (c)	90. (d)	

व्याख्या | सामान्य हिन्दी : वर्ष 2004 (पेपर)

1. (d) 'एक तो करेला दूजे नीम चढ़ा' का अर्थ है— किसी दुर्जन के साहचर्य से दुष्ट व्यक्ति की दुष्टता में और अधिक वृद्धि।
अतः विकल्प (d) सही है।
2. (c) 'गंगा गये गंगा दास, जमुना गये जमुना दास' का अर्थ है।
अवसरवादी होना।
अतः विकल्प (c) सही है।
3. (d) **शुद्ध शब्द:** संन्यासी
अतः विकल्प (d) सही है।
4. (c) **शुद्ध शब्द:** उपर्युक्त
अतः विकल्प (c) सही है।
5. (c) शब्द 'मनमानी' पुल्लिङ्ग नहीं है।
अतः विकल्प (c) सही है।
6. (c) उर्दू को उत्तर-प्रदेश में दूसरी राजभाषा के रूप में मान्यता है।
अतः विकल्प (c) सही है।
7. (b) 'एक अनार सौ बीमार' एक कहावत है।
अतः विकल्प (b) सही है।
8. (d) नीरज और अम्बुज 'कमल' के पर्यायवाची हैं।
अतः विकल्प (d) सही है।
10. (c) 'इन दोनों कमरों के बीच में एक दीवार है।
अतः विकल्प (c) सही है।
11. (c) मेरी **सौभाग्याकांक्षिणी** कन्या का विवाह होने जा रहा है।
अतः विकल्प (c) सही है।
12. (c) पवन, मारुत, समीर शब्द 'वायु' के पर्यायवाची हैं जबकि अनल का अर्थ है 'अग्नि'।
अतः विकल्प (c) सही है।
13. (b) 'संयोग' शब्द का विलामे है— 'वियोग'
अतः विकल्प (b) सही है।
14. (a) 'पत्थर' का तत्सम शब्द है— 'प्रस्तर'
अतः विकल्प (c) सही है।
16. (d) 'जागृति' का विलोम है— 'सुषुप्ति'
अतः विकल्प (d) सही है।
17. (a) **शुद्ध शब्द:** प्रौद्योगिकी
अतः विकल्प (a) सही है।
19. (d) 'नाच न जाने आँगन टेढ़ा' का अर्थ है— अपनी अयोग्यता छिपाने के लिए साधन को दोष देना।
अतः विकल्प (d) सही है।
20. (a) रंगा सियार का अर्थ है— 'धूर्त आदमी'
अतः विकल्प (a) सही है।
21. (d) हिमकर (चन्द्रमा) का विलोम है दिनकर (सूर्य)।
अतः विकल्प (d) सही है।
22. (c) इटावा ब्रज भावा का क्षेत्र है। अतः भोजपुरी इटावा जिले में नहीं बोली जाती है।
23. (*)

'च' वर्ग'	च, छ, ज, झ, ञ
'क वर्ग'	क, ख, ग, घ, ङ
'त वर्ग'	त, थ, द, ध, न
ऊष्म	श, ष, स, ह
24. (b) भोजपुरी बोली का प्रसार भारत के बाहर सूरीनाम, फिजी, मारिशस, गयाना, त्रिनिडाड में है। इस दृष्टि से भोजपुरी अंतर्राष्ट्रीय महत्व की बोली है।
अतः विकल्प (b) सही है।
25. (c) अयोध्या सिंह 'हरिऔध' खड़ी बोली के कवि है।
अतः विकल्प (c) सही है।
26. (b) 'आई' प्रत्यय 'खाई' शब्द में नहीं लगा है।
अतः विकल्प (b) सही है।
28. (b) 'सीमा, जाओ बाहर खेलो' एक आज्ञावाचक वाक्य है।
अतः विकल्प (b) सही है।
29. (a) जो कठिनाई से समझ में आये— 'दुर्बोध'
अतः विकल्प (a) सही है।
30. (c)

उपसर्ग		मूल शब्द		शब्द
सु	+	कर्म	=	सुकर्म
सु	+	गम	=	सुगम
सु	+	मन	=	सुमन

अतः शब्द 'सुअर' में 'सु' उपसर्ग नहीं है।

UPPSC-AE

Combined State Engineering
Services Examination

Section - C

General Studies



Objective Previous Years Questions

2007(I)

- Q.1** It is believed that deposits of cholesterol in the body are responsible for:
(a) tooth decay (b) liver disorders
(c) heart disorders (d) cancer
- Q.2** Which one of the following chemicals is used to preserve food material?
(a) Caustic soda (b) Sodium benzoate
(c) Sodium chloride (d) Sulphuric acid
- Q.3** Which one of the following diseases is not caused by virus?
(a) polio (b) small pox
(c) tuberculosis (d) AIDS
- Q.4** The depth of oceans is usually measured in:
(a) feet (b) fathoms
(c) metres (d) nautical miles
- Q.5** 'Jarvik-7' is:
(a) electronic leg (b) pace maker
(c) artificial heart (d) artificial eye
- Q.6** Which one of the following statements is not correct?
(a) Iron sinks in water
(b) Iron floats in mercury
(c) Mercury floats in water
(d) Wood floats in water
- Q.7** Ozone absorbs solar radiation in the range of
(a) 240 to 280 μm (b) 280 to 320 μm
(c) 320 to 400 μm (d) 400 to 700 μm
- Q.8** Which one of the following Vitamins helps in the process of blood clotting?
(a) Vitamin C (b) Vitamin D
(c) Vitamin E (d) Vitamin K
- Q.9** Which one of the following forms an irreversible complex with haemoglobin of the blood?
(a) Carbon-dioxide
(b) Pure Nitrogen gas
(c) Carbon monoxide
(d) Mixture of Carbon-dioxide and Helium

- Q.10** Which one of the following expresses error in computer data?
(a) chip (b) byte
(c) bug (d) bit
- Q.11** India won the legal battle against the USA in the patenting of the medicinal plant of:
(a) Neem (b) Haldi
(c) Tulsi (d) Pudina
- Q.12** Which one of the following is responsible for the colour of the skin?
(a) Enzymes (b) Epidermis
(c) Hormones (d) Melanin
- Q.13** Energy required for the process of food manufacture in green plants comes from:
(a) oxygen (b) carbon dioxide
(c) glucose (d) sunlight
- Q.14** Which one of the following statements is not true?
(a) Apple was introduced in India from outside
(b) Apple is rich in roughage
(c) Apple has high content of calcium
(d) Apple has high content of iron
- Q.15** The vaccine for polio was first prepared by:
(a) Paul Ehrlich (b) Joseph Lister
(c) Louis Pasteur (d) Jonas Salk

2007(II)

- Q.16** Cyanide poisoning causes immediate death as it directly affects
(a) perspiration
(b) cellular respiration
(c) blood circulation
(d) digestion
- Q.17** The Apollo Mission of NASA could map only 25% of the total Moon surface. India's Chandrayan-I mapped what percentage of Moon surface?
(a) 75% (b) 80%
(c) 90% (d) 95%

Answers | General Science

1. (a)	18. (d)	35. (c)	52. (b)	69. (b)	86. (c)
2. (b)	19. (c)	36. (b)	53. (c)	70. (c)	87. (b)
3. (c)	20. (d)	37. (b)	54. (d)	71. (a)	88. (d)
4. (b)	21. (c)	38. (d)	55. (d)	72. (b)	89. (a)
5. (c)	22. (c)	39. (b)	56. (a)	73. (b)	90. (b)
6. (c)	23. (b)	40. (d)	57. (a)	74. (c)	91. (d)
7. (a)	24. (a)	41. (d)	58. (d)	75. (c)	92. (a)
8. (d)	25. (c)	42. (b)	59. (b)	76. (c)	93. (c)
9. (c)	26. (a)	43. (a)	60. (c)	77. (d)	94. (b)
10. (c)	27. (a)	44. (a)	61. (d)	78. (c)	95. (d)
11. (a)	28. (a)	45. (a)	62. (b)	79. (d)	96. (c)
12. (d)	29. (c)	46. (b)	63. (a)	80. (d)	97. (b)
13. (d)	30. (b)	47. (a)	64. (b)	81. (b)	98. (c)
14. (b)	31. (d)	48. (d)	65. (b)	82. (a)	99. (c)
15. (d)	32. (c)	49. (a)	66. (c)	83. (b)	100. (d)
16. (b)	33. (b)	50. (b)	67. (d)	84. (b)	101. (b)
17. (d)	34. (d)	51. (b)	68. (b)	85. (a)	

Explanations | General Science

1. (c)

Cholesterol is a type of Fat (lipid) made by our body. It is essential for good health and is found in every cell in our body however, having a high level of certain type of Cholesterol in our blood (hyper cholesteralaemia) can increase. Possibility of cardiovascular disease, such as heart disease and stroke. High Cholesterol fatty deposit (knows plaques) to built up inside our blood vessels. In time, the blood vessels supplying our heart may become so narrow they can't deliver oxygen to our heart. Muscle, particularly when we are exerting ourself. This can cause chest pain. If a fatty plaque breaks off it may cause a blood clot that can block blood flow to our heart (heart attack) or if the same process occurs in your brain it may cause a stroke.

2. (b)

Sodium benzoate and other benzoates are the principle organic chemicals used as food

preservatives. The use of benzoates in certain products in prescribed quantity (usually not exceeding 0.1 percent) is permitted in most countries. Sometimes, sodium chloride is also used as food preservative as preservation of meat, fishes, pickles etc.

3. (c)

Tuberculosis, commonly known as TB, is a bacterial infection that can spread through the lymph nodes and blood stream to any organ in our body. It is most after found in the lungs. Most people who are exposed to TB never develop symptoms because the bacteria can live in an inactive form in the body. But if the immune system weakens, such as in people with HIV or elderly adults. TB bacteria can become active in their active state, it can cause death of tissue in the organs they inject. Active TB disease can be fatal if left untreated.

UPPSC-AE

Combined State Engineering
Services Examination

Section - D

Civil Engineering



Model Practice Sets

UPPSC-AE

UTTAR PRADESH PUBLIC SERVICE COMMISSION

Combined State Engineering Services Exam : Assistant Engineer

CIVIL ENGINEERING

Model Practice Set : 1

Paper-I

Duration: 2.30 hr.

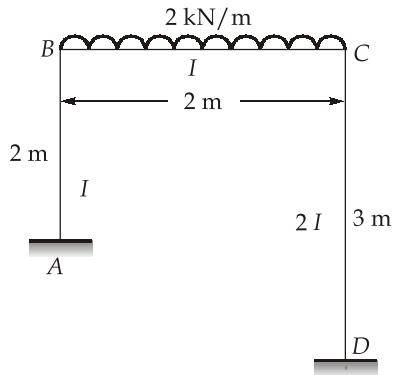
Maximum Marks: 375

Read the following instructions carefully

1. Immediately after the commencement of the examination, you should check that this booklet **does not** have any unprinted or torn or missing pages or items etc. If so, get it replaced by a complete test booklet.
2. Encode clearly the test booklet series **A, B, C** or **D**, as the case may be, in the appropriate place in the answer sheet using ball point pen (blue or black).
3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside.
DO NOT write **anything else** on the Test Booklet.
4. This Test Booklet contains 125 questions. Each question comprises four responses (answers). All questions carry equal marks. There is provision of negative marking of 1 mark for every wrong answer attempted.
5. Use of calculator is not permitted.
6. Attempt **ALL** questions. Your total marks will depend **Only** on the number of correct responses with corresponding reduction for wrong answers marked by you.
7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your admission Certificate.
8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to invigilator **Only the Answer Sheet**. You are permitted to take away with you the Test Booklet.

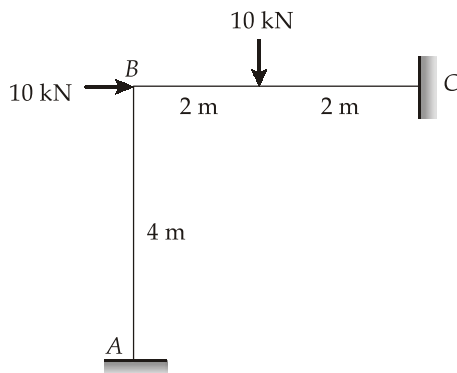
DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ASKED TO DO SO

- Q.1** The slope deflection equation at end B of the member BC for the portal frame shown in the figure is



- (a) $M_{BC} = 0.67 + EI\theta_B + 2EI\theta_C$
 (b) $M_{BC} = -1 + 2EI\theta_B + EI\theta_C$
 (c) $M_{BC} = -0.67 + 2EI\theta_B + EI\theta_C$
 (d) $M_{BC} = 0.67 + 2EI\theta_B + EI\theta_C$

- Q.2** Number of point of contraflexure in the given structure is



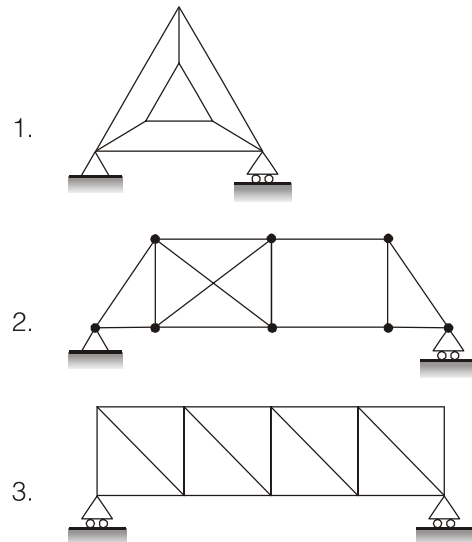
- (a) 1 (b) 2
 (c) 3 (d) 4

- Q.3** For a 2 hinged parabolic arch, V is sum of the vertical forces in upward direction and H is horizontal thrust on the left hand side of section A-A. If α is the angle of tangent at the point on arch with horizontal, the normal thrust at section A-A from left hand side is given by
 (a) $V\sin\alpha - H\cos\alpha$ (b) $V\cos\alpha - H\sin\alpha$
 (c) $V\sin\alpha + H\cos\alpha$ (d) $V\cos\alpha + H\sin\alpha$

- Q.4** A symmetrical parabolic arch of span L and rise h is hinged at both ends. The arch carries a UDL along the entire span. Which of the following has non-zero value?

1. Horizontal thrust.
 2. Radial shear.
 3. Bending moment.
 4. Vertical reaction at support.
- (a) 1, 2 and 3 only (b) 2 and 3 only
 (c) 1 and 4 only (d) 3 and 4 only

- Q.5** Which of the following trusses is/are unstable?



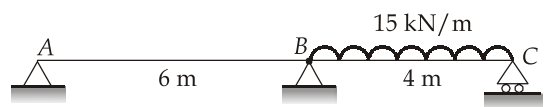
- (a) 1 and 2 only (b) 2 and 3 only
 (c) 1 and 3 only (d) 1, 2 and 3

- Q.6** For a stiffness matrix $[S] = \frac{EI}{63} \begin{bmatrix} 4 & -9 \\ -9 & 36 \end{bmatrix}$, what

is its flexibility matrix?

- (a) $[F] = \frac{63}{EI} \begin{bmatrix} 36 & 9 \\ 9 & 4 \end{bmatrix}$
 (b) $[F] = \frac{1}{EI} \begin{bmatrix} 36 & -9 \\ -9 & 4 \end{bmatrix}$
 (c) $[F] = \frac{1}{EI} \begin{bmatrix} 36 & 9 \\ 9 & 4 \end{bmatrix}$
 (d) $[F] = \frac{1}{EI} \begin{bmatrix} 4 & -9 \\ -9 & 36 \end{bmatrix}$

- Q.7** A continuous beam with uniform flexural rigidity is shown below.



Moment at B is

- (a) 12 kN-m (b) 14 kN-m
 (c) 16 kN-m (d) 18 kN-m

UPPSC-AE

Model Practice Set : 1

Civil Engineering

Answer Key

Paper-I

1. (c)	26. (b)	51. (a)	76. (c)	101.(c)
2. (c)	27. (c)	52. (c)	77. (c)	102.(a)
3. (c)	28. (c)	53. (c)	78. (a)	103.(d)
4. (c)	29. (c)	54. (c)	79. (d)	104.(c)
5. (d)	30. (c)	55. (b)	80. (c)	105.(a)
6. (c)	31. (c)	56. (b)	81. (b)	106.(d)
7. (a)	32. (a)	57. (d)	82. (d)	107.(d)
8. (b)	33. (d)	58. (d)	83. (d)	108.(c)
9. (d)	34. (c)	59. (a)	84. (d)	109.(b)
10. (d)	35. (a)	60. (c)	85. (c)	110.(c)
11. (d)	36. (d)	61. (d)	86. (d)	111.(c)
12. (c)	37. (c)	62. (a)	87. (c)	112.(d)
13. (c)	38. (d)	63. (b)	88. (d)	113.(d)
14. (c)	39. (c)	64. (d)	89. (c)	114.(c)
15. (c)	40. (b)	65. (c)	90. (a)	115.(d)
16. (a)	41. (b)	66. (b)	91. (c)	116.(b)
17. (b)	42. (a)	67. (a)	92. (c)	117.(b)
18. (b)	43. (d)	68. (d)	93. (b)	118.(c)
19. (c)	44. (a)	69. (d)	94. (d)	119.(d)
20. (c)	45. (c)	70. (b)	95. (b)	120.(a)
21. (c)	46. (b)	71. (b)	96. (d)	121.(a)
22. (b)	47. (a)	72. (a)	97. (a)	122.(c)
23. (a)	48. (c)	73. (b)	98. (c)	123.(c)
24. (b)	49. (c)	74. (a)	99. (a)	124.(d)
25. (c)	50. (a)	75. (c)	100.(d)	125.(c)

DETAILED EXPLANATIONS

1. (c)

$$M_{FBC} = \frac{-2 \times 2^2}{12} = -\frac{2}{3} = -0.67 \text{ kNm}$$

Now, slope deflection equation at B:

$$M_{BC} = M_{FBC} + \frac{2EI}{L} \left(2\theta_B + \theta_C - \frac{3\delta}{L} \right)$$

$$M_{BC} = -0.67 + \frac{2EI}{2} (2\theta_B + \theta_C - 0)$$

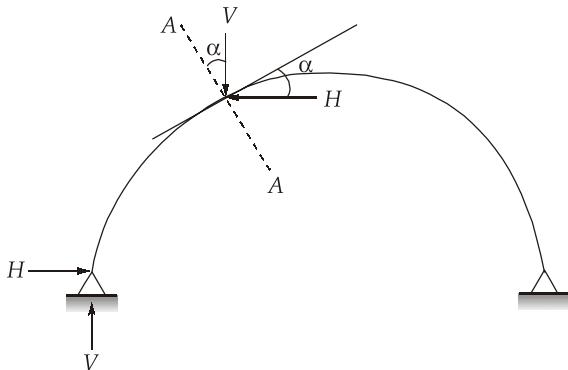
$$M_{BC} = -0.67 + 2EI\theta_B + EI\theta_C$$

2. (c)

For the member BC, P.O.C = 2 due to fixation of supports at both ends.

For the member BA, P.O.C = 1 due to carry over moment concept.

3. (c)

Normal thrust at section A-A = $H \cos \alpha + V \sin \alpha$

4. (c)

This arch will act as a theoretical arch or linear arch in which bending moment and radial shear both are zero along the entire arch.

5. (d)

- In 1st structure, rigid body rotation of inner triangle.
- In 2nd structure, there is no inclined member to resist shear force in one of the part of given truss.
- In 3rd structure, rigid body translation of whole structure.

6. (c)

Flexibility matrix is inverse of stiffness matrix.

$$[F] = \frac{1}{[S]}$$

$$[F] = \frac{1}{EI} \begin{bmatrix} 36 & 9 \\ 9 & 4 \end{bmatrix}$$

7. (a)

Distribution factor:

		Stiffness	Total stiffness	D.F.
B	BA	$3EI/6$	$5EI/4$	$2/5$
	BC	$3EI/4$		$3/5$

FEM's: $M_{FBA} = 0$, $M_{FAB} = 0$

$$M_{FBC} = \frac{-15 \times 4^2}{12} = -20 \text{ kNm}$$

$$M_{FCB} = +20 \text{ kNm}$$

Joints:

	A		B		C	
Members:	AB	BA	BC	CB		
D.F.:	1	$2/5$	$3/5$	1		
FEM's:	0	0	-20	20		
Release and Co:	0	0	-10	-20		
Net FEM's	0	0	-30	0		
Release	0	+12	+18			
Final end moments	0	+12	-12	0		

8. (b)

Kani's method is displacement method of analysis.

9. (d)

