

INSTITUTE OF ACTUARIES OF INDIA

CP1B - Actuarial Practice

May 2026 Examination

INDICATIVE SOLUTION

Introduction:

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiners have given credit for any alternative approach or interpretation which they consider to be reasonable.

Solution 1:

- i) Insurers may hold a buffer above the minimum to avoid breaching the regulatory threshold.
- RBC requirements may be volatile due to market movements, so some cushion capital.
 - New models, hence holding extra capital for model risk.
 - Uncertainty around supervisory expectations under the relatively new regime.
 - Firms may have raised capital conservatively at transition and not yet adjusted capital levels downward.
 - Reduced product innovation may have limited growth opportunities, leading to capital accumulation.
 - A shift toward lower-risk assets may reduce capital requirements, increasing solvency ratios mechanically.
 - Rating agencies may require capital levels above regulatory minimums to maintain target ratings.
 - Policyholders, brokers and counterparties may prefer insurers with stronger solvency positions.
 - Public disclosure of solvency ratios may create reputational incentives to maintain high capital buffers.
 - To signal strength and gain competitive advantage.
 - Conservative stance until they gain confidence in capital optimisation under the new regime.

[8]**ii)****a) Product Innovation:**

- increased capital requirements for higher-risk or long-term guarantee products.
- Higher capital requirements reduce return on equity (ROE) for such products.
- Lower ROE reduces shareholder appetite for innovative / capital-intensive products.
- New products may have limited historical data, leading to conservative capital calibration.
- Conservative calibration increases capital strain at product launch.
- Capital strain makes pricing less competitive.
- Firms may prioritise optimising existing products rather than developing new ones.
- Greater regulatory scrutiny under RBC may increase approval time for new products.
- Increased compliance and modelling costs divert resources from product development.
- Risk-sensitive capital charges may discourage products with embedded guarantees or options

[3]**b) Market Concentration**

- RBC implementation increases compliance and modelling costs.
- These fixed costs are proportionally higher for smaller insurers.
- Smaller insurers may struggle to raise additional capital required under RBC.
- Larger insurers may have better access to capital markets.
- Higher capital requirements may reduce profitability of niche players.
- Firms unable to meet required solvency ratios may exit or be acquired.
- Larger firms may benefit more from diversification credits under RBC.
- Diversification benefits reduce effective capital requirements for larger groups.
- Stronger capital ratios may enhance reputation of larger insurers.
- This may shift business toward larger firms, increasing concentration.

[3]**c) Investment strategy**

- RBC imposes higher capital charges on volatile assets (e.g. equities).
- Higher charges reduce risk-adjusted returns on such assets.
- Insurers may reallocate toward lower volatility assets (e.g. government bonds).
- RBC may introduce mark-to-market valuation, increasing balance sheet volatility.
- To reduce solvency ratio volatility, firms may shorten asset duration.
- Asset-liability matching may be strengthened to reduce capital strain.
- Capital charges for credit risk may encourage higher-rated bond holdings.
- Firms may avoid illiquid or complex assets with punitive capital treatment.

[3]

d)

- Reliance on reinsurance
- RBC may allow capital relief for risk transfer through reinsurance.
- Reinsurance reduces net underwriting risk exposure.
- Lower net risk reduces required capital under RBC.
- Capital relief may improve solvency ratios without raising new equity.
- Firms may structure more complex reinsurance to optimise capital benefits.
- Smaller insurers may rely more heavily on reinsurance to remain solvent.
- Global reinsurers may have stronger capital positions under RBC equivalence regimes.
- This may lead to concentration of reinsurance with a few large global players.

[3]

iii) Whether the outcomes represent success or failure depends on the regulator's primary objective — prudential strength versus market efficiency and competition.

Success factors:

- Insurers holding capital above minimum suggests improved solvency resilience
- Lower probability of insurer default enhances policyholder protection
- Shift toward lower-volatility assets reduces balance sheet risk for long-term investment portfolios
- Reduced risk-taking may improve financial system stability.
- Increased use of reinsurance may improve risk transfer and diversification.
- Exit of weakly capitalised insurers may strengthen overall market quality
- Risk-sensitive capital may have corrected prior underpricing of guarantees.
- Greater transparency under RBC may enhance market discipline.

Failures:

- Reduced product innovation may limit consumer choice.
- Reduced innovation may restrict access to protection products.
- Market concentration may reduce competition.
- Reduced competition may increase prices for policyholders.
- Excessively conservative investment strategies may reduce long-term returns.
- Lower returns may increase cost of insurance or reduce bonuses.
- Complex and concentrated reinsurance may increase systemic counterparty risk.
- Holding capital far above minimum may indicate over-calibration or inefficiency.
- Reduced returns may make the savings segment of life insurance business less attractive and may push policyholders to more attractive savings products like MFs
- In the long run may increase unit costs as volumes decline leading to higher frictional costs.
- The regulator will need to ensure that excessive risk aversion should not lead to the destruction of the industry.

[8]

iv) Calibration and design

- Review calibration of capital charges to ensure they are proportionate to underlying risk.
- Adjust overly conservative stress parameters where evidence supports refinement.
- Introduce counter-cyclical adjustments to reduce excessive capital volatility.
- Allow greater recognition of diversification
- Provide clearer guidance to reduce uncertainty around supervisory expectations.
- Streamline approval processes for new products under RBC.

Proportionality based on size

- Apply proportional requirements for smaller insurers.
- Simplify reporting and modelling requirements for less complex firms
- Permit simplified standard approaches where risk profile is straightforward.
- Facilitate capital access for smaller firms (e.g., transitional measures).

Treatment of assets

- Review capital treatment of long-term assets to ensure charges reflect actual long-term credit and default risk rather than short-term market movements,
- So, insurers are not discouraged from investing in infrastructure or long-duration corporate bonds suitable for annuity liabilities.
- Refine capital treatment of illiquid assets where empirical evidence shows stable cashflows and low default experience recognising that insurers with long-term liabilities may not require high liquidity buffers.
- Reduce artificial balance sheet volatility arising from valuation mismatches or short-term interest rate movements, where such volatility does not materially affect the insurer's long-term ability to meet policyholder obligations. (example - Interest rates fall sharply --> The market value of liabilities increases immediately--> If assets are not valued consistently, solvency may appear to deteriorate, even though long-term cashflows are unchanged.)

Reinsurance

- Strengthen monitoring of reinsurance concentration risk.
- Apply counterparty risk charges reflecting concentration exposure.
- Ensure capital relief reflects genuine risk transfer.
- Enhance disclosure of complex reinsurance structures.
- Market and competition considerations
- Conduct periodic impact studies on competition and innovation.
- Engage with industry to identify barriers to product development.
- Encourage sandbox or pilot frameworks for innovative products.
- Introduce transitional arrangements for capital-intensive legacy products.
- Encourage development of internal models subject to strong governance.
- Maintain strong supervision while improving clarity and predictability of rules.

[17]

[45 marks]

Solution 2:

i) Improved risk segmentation reduces adverse selection.

- More granular pricing improves alignment of premium with risk.
- Reduced claims ratio lowers expected underwriting losses
- More frequent recalibration reduces pricing lag risk.
- More accurate pricing may stabilise underwriting margins initially.
- Continuous repricing may increase short-term earnings volatility.
- Greater responsiveness may amplify reaction to emerging loss trends.
- Reduced cross-subsidisation (0.5) may increase volatility within narrower segments.
- Risk shifts from underwriting uncertainty to model dependency.
- Greater exposure to model risk and algorithmic error.
- Increased reliance on external data increases data-quality risk.
- Risk profile becomes more technology driven. example - Concentration in tech-enabled households may increase exposure to technology-related loss drivers.
- Business mix shifts toward digitally active policyholders
- Reduced representation of certain groups narrows demographic diversity.
- Reduced heterogeneity within portfolio may increase sensitivity to behavioural changes.
- Greater reliance on telematics and smart-home systems increases operational dependencies.
- Cyber risk becomes a more material component of overall risk profile.
- System outages could directly disrupt underwriting and pricing processes.
- Technology failure may have immediate financial impact.
- Use of alternative data may increase risk of perceived unfairness

- Opaque models increase regulatory and compliance exposure.
- Legal risk may arise if discriminatory outcomes are alleged.
- Reputational risk may affect retention and brand value.
- Improved pricing accuracy may improve capital efficiency.
- Lower expected losses may strengthen solvency position.
- Competitive advantage may erode as peers adopt similar models.
- AI related increased governance.

[8]

ii)

- Use of similar AI models may result in similar risk selection across insurers.
- Similar risk selection leads to more homogeneous portfolios.
- Homogeneous portfolios increase correlation of losses across firms.
- Common data sources create shared exposure to data errors.
- In short term, improved pricing may strengthen individual solvency.
- Simultaneous premium increases may reduce availability of cover for some segments of policyholders.
- Reliance on common technology vendors (cloud services, data providers, telematics device manufacturers) creates operational concentration risk.
- Cloud or telematics failure could impact multiple insurers at once.
- Continuous recalibration may cause simultaneous pricing adjustments.
- If models are mis-specified, errors may affect multiple insurers simultaneously.
- Rapid adoption may outpace regulatory understanding.
- Sector may become vulnerable to common cyber-attacks.
- Perceived accuracy may create overconfidence across firms.

Long term

- In long term, reduced heterogeneity may weaken sector resilience.
- AI may encourage risk segmentation, reducing pooling benefits.
- Reduced pooling may increase volatility in residual risk segments.
- Market-wide model updates may amplify procyclicality.
- Correlation of behavioural responses may increase market instability.
- Competitive pressure may reduce independent model development.
- AI-driven withdrawal from certain segments may distort market structure.
- Capital models may underestimate correlation of exposures.
- Regulatory intervention may be triggered if instability emerges.
- Overall, firm-level gains may mask sector-level fragility.
- Sector-wide instability may arise from correlated shocks.

[10]

iii)

- Persistent under-representation may reduce breadth of risk pool.
- Narrower pools may increase volatility of experience.
- Exclusion of higher-risk groups may undermine risk sharing principles.
- Remaining/ left-out market segments may become unaffordable.
- Concentration in digitally active segments may increase behavioural risk.
- Long-term sustainability depends on maintaining diversified exposures.
- Use of proxy variables may unintentionally embed bias.
- Under-representation of vulnerable segments may create reputational risk.
- Perceived unfairness may invite regulatory scrutiny.
- Reduced access to insurance may worsen social inequality.
- Financial exclusion may undermine market legitimacy.
- AI may disproportionately disadvantage digitally inactive groups.

- Ethical concerns may affect brand value.
- Regulatory action may impose restrictions on AI use.
- Market-wide segmentation may weaken pooling across society.
- Persistent segmentation may create political pressure for reform.
- Failure to ensure fairness may increase litigation risk.
- Inclusive design may support long-term growth.
- Sustainability requires balancing accuracy with accessibility.
- Cross-subsidisation may reduce if segmentation intensifies.
- Long-term profitability may suffer if excluded groups expand.
- AI transparency concerns may reduce consumer trust.
- Trust erosion may affect retention rates.
- Fairness considerations may become strategic risk factors.

[12]

iv)

- Strengthen model validation and independent review processes.
- Enhance board oversight of AI strategy and risk appetite.
- Implement explainability and transparency standards.
- Monitor model bias and fairness metrics regularly.
- Conduct stress testing for model failure scenarios.
- Develop contingency plans for technology disruption.
- Ensure compliance with data protection regulations.
- Engage with regulators proactively on AI usage.
- Establish clear accountability for AI decisions.
- Review concentration risk in technology vendors.
- Monitor portfolio concentration by demographic segment.
- Implement robust cyber security controls.
- Ensure ethical guidelines are embedded in underwriting.
- Regularly review long-term strategic implications.
- Align remuneration with prudent AI risk management.
- Promote internal expertise in data governance.

[6]

v)

- Product addresses emerging societal risk.
- Demand may be high due to fear of AI job displacement.
- Short benefit duration limits insurer exposure. but given the large young population employed in services, potentially large exposure
- Difficulty defining 'AI-related' job loss.
- Verification of cause of unemployment may be complex.
- High correlation of claims during economic downturns.
- High correlation of claims because AI will affect maybe one sector at a time, and then the next. So, waves of correlated claims can occur.
- Risk of adverse selection only high-risk workers purchase.
- Moral hazard if policyholders reduce job search effort.
- Pricing uncertainty due to limited historical data.
- Potential regulatory classification issues.
- Operational cost of claims assessment may be high
- Potential reputational benefits from positive societal impact of the product.
- Reinsurance may be difficult due to systemic nature of risk.
- Short-term policies may have high lapse rates.

- Product may overlap with existing unemployment schemes.
- Affordability concerns for young workers, especially in sectors that are already adopting AI.
- Capital requirement may be high due to correlation risk.
- Exposure may be concentrated in specific sectors.
- Economic cycles may significantly affect claims.
- Behavioural uncertainty increases volatility of experience.
- Product may enhance corporate image.
- Low attachment rates may limit profitability.
- Distribution strategy will affect viability – cost of selling.
- Underwriting criteria may be difficult to design fairly.
- Long-term sustainability uncertain due to structural change.
- Public policy intervention may crowd out demand.
- Claims spike risk during rapid AI adoption.
- Need for robust reserving due to uncertainty.
- Overall viability depends on pricing, risk controls and demand.
- Careful pilot launch may reduce uncertainty.

[15]

vi)

- Introduce waiting period before benefit eligibility.
- Require minimum employment tenure.
- Limit cover to defined sectors.
- Impose benefit caps to limit exposure.
- Use co-payments or deductibles to reduce moral hazard.
- Offer group cover through employers.
- Purchase reinsurance protection.
- Clarify definition of qualifying job loss.
- Regularly review pricing assumptions.
- Collect industry-specific data for better risk assessment.
- Instead of fixed benefit for a few months, cost of retraining/ vocational training, etc., can be considered, (any other alternative reasonable design considerations)

[4]

[55 marks]
