PART B: Cloze Test

***Directions:** Read the following passage and decide which choice (1), (2), (3), or (4) best fits each space. Then mark the correct choice on your answer sheet.*

For 20 years, children have been treated (11) ---------- all sorts of programs on television which are supposed to help them become better at skills such as reading and math. These programs have presented (12) ---------- such as counting and recognition of letters as nothing but fun, (13) ---------- by such things as rainbows and jumping frogs. (14) ---------- no improvement in children's abilities in literacy and numeracy (15) ----------. These fun ways of teaching such skills don't seem to work.

11- 1) in 2) for 3) to 4) on

12- 1) the learning of skills 2) skills to learn
3) the skills of learning 4) learning of skills in

13- 1) are accompanied 2) to accompany
3) being accompanied 4) to be accompanied

14- 1) In spite of 2) But 3) Although 4) Whereas

15- 1) would observe 2) it observes
3) has been observed 4) to be observed

PART C: Reading Comprehension

***Directions:** Read the following three passages and answer the questions by choosing the best choice (1), (2), (3), or (4). Then mark the correct choice on your answer sheet.*

PASSAGE 1:

The ability of the foundation structure to bear the seismic actions is important for the overall earthquake resistance of the building. Usually, cantilever walls, as well as frame columns, rest on one or more basement storeys («rigid box») or on a massive raft. According to the principles of the capacity design method, the foundations should be able to transfer the overstrength sectional forces of the plastic zones to the ground without yielding. Foundation structures should always remain elastic since plastic deformations generally lead to an unpredictable behavior and additional displacements and stresses in the building structure. Besides, repairs are usually substantially more difficult to execute in the foundation than in the building structure. The reinforcement must therefore be strengthened directly below the plastic zones and detailed accordingly.

When the foundation structure forms a rigid box made up of reinforced concrete walls and slabs, it should be checked that the path of compression, shear, and tensile forces can be transferred from the plastic zones of the structural walls through the slabs to the exterior walls and to the raft. It may be necessary to reinforce these structural elements (accounting for possible recesses and openings) and to increase locally the depth of the raft and to account for a local increase in bearing pressure acting on the soil beneath the walls.

To ensure that seismic forces can be transferred to the soil it is advisable to study the force path in the foundation structure. The allowable soil stresses under dynamic action may be higher than the corresponding static stresses, but care should be taken to ensure that plastic dsformations of the soil are avoided under all circumstances.

16- The best title for this passage is ----------.
1) Bearing the Seismic Actions
2) The Importance of Right Box in a Building
3) Protect Foundation Through Capacity Design
4) Pressure Distribution Acting on the Soil

البته با توجه به سلیقه ی طراح گزینه 3 هم ممکنه جواب تست باشه

17- Reinforcing the structural elements of foundation is carried out in order to ----------.
1) deepen the structure of the raft
2) ensure that seismic forces can be transferred to the soil
3) investigate the force path in the foundation structure
4) convince the soil stresses are higher than the static ones

18- The word "detailed" in the last line of paragraph 1 means ----------.
1) strengthened 2) divided
3) supported 4) developed

تایید اصلی

19- It's stated in the passage that the foundations ----------.
1) should be sufficient to cover all recesses and openings
2) should more essentially be repaired than other structural members
3) form a rigid box constructed on the plastic zones
4) should be capable of transferring all applied forces without failure

20- All of the following are the consequences of plastic deformations EXCEPT----------.
1) unforceable circumstances 2) additional dislocation
3) territorial behaviour 4) tension in the building structure

داخل متن
منطقی
unpredictable

PASSAGE 2:

این گزینه یک مفهوم زیستی است

Prestressed concrete is a form of concrete used in construction. It is substantially "prestressed" (compressed) during production. in a manner that strengthens it against tensile forces which will exist when in service.

This compression is produced by the tensioning of high-strength "tendons" located within or adjacent to the concrete and is done to improve the performance of the concrete in service. Tendons may consist of single wires, multi-wire strands or threaded bars that are most commonly made from high-tensile steels, carbon fiber or aramid fiber. The essence of prestressed concrete is that once the initial compression has been applied, the resulting material has the characteristics of high-strength concrete when subject to any subsequent compression forces and of ductile high-strength steel when subject to tension forces. This can result in improved structural capacity and/or serviceability compared with conventionally reinforced concrete in many situations. In a prestressed concrete member, the internal stresses are introduced in a planned manner so that the stresses resulting from the superimposed loads are counteracted to the desired degree.

24 مربوط به tendons و کاربردها

23 21 25

Prestressed concrete is used in a wide range of building and civil structures where its improved performance can allow for longer spans, reduced structural thicknesses, and material savings compared with simple reinforced concrete.

منظور اینکه تنش های فشاری داخلی و تنش های کششی خارجی با هم خنثی می شوند تا بتن تحت کشش نباشد

generally means live load
a load that is in addition to the dead weight of the bar

First used in the late-nineteenth century, prestressed concrete has developed beyond pretensioning to include post-tensioning, which occurs after the concrete is cast. Tensioning systems may be classed as either monostrand, where each tendon's strand or wire is stressed individually, or multi-strand, where all strands or wires in a tendon are stressed simultaneously. Tendons may be located either within the concrete volume or wholly outside of it. While pre-tensioned concrete uses tendons directly bonded to the concrete, post-tensioned concrete can use either bonded or unbonded tendons.

22

21- Prestressed concrete is produced in order to ----------.
1) improve the performance of concrete in construction
2) aggravate a good amount of tensile stress
3) have a structure with less weight and intensity
4) decrease the additional special equipment that construction requires

داخلی

22- Internal prestressing refers to ----------.
1) tensioning occurring after the concrete is cast
2) locating elements within the concrete member
3) tendons directly bonded to the concrete
4) each tendon's strand or wire stressed individually

23- The tendons are made from all of the following EXCEPT ----------.
1) carbon fiber
2) aramid fiber
3) high-tensile steels
4) single-wire strands

اگه منظور طراح تاندون دوم باشد

24- The next following paragraph most likely is about ----------.
1) bonded post-tensioning
2) pre-tensioned concrete
3) unbounded post-tensioning
4) tendons applications

25- The word "counteracted" in paragraph 2 means ----------.
1) neutralized
2) reacted
3) allowed
4) worsened

PASSAGE 3:

تمامی دلایل عملکرد خوب سازه‌ی فولادی در برابر زمین لرزه

26

There are some advantages for steel structures in a seismic zone, namely their flexibility and low weight. These structures attract smaller forces when an earthquake hits. Steel structures are generally more flexible than other types of structure and lower in weight. Forces in the structure and its foundations are therefore lower. This reduction of design forces significantly reduces the cost of both the superstructure and foundations of a building.

با کاهش نیروها هزینه‌ها کاهش پیدا می‌کند سبک و انعطاف‌پذیر

27

Steel structures are generally light in comparison to those constructed using other materials. As earthquake forces are associated with inertia, they are related to the mass of the structure and so reducing the mass inevitably leads to lower seismic design forces. Indeed some steel of structures are sufficiently light that seismic design is not critical. This is particularly the case for halls/sheds: they create an envelope around a large volume so their weight per unit surface area is low and wind forces, not seismic forces, generally govern the design. This means that a building designed for gravity and wind loads implicitly provides sufficient resistance to earthquakes. This explains why in past earthquakes such buildings have been observed to perform so much better than those made of heavy materials.

29

در سازه‌های سبک نیروی باد مهم و نیروی لرزه‌ای چندان نیست

30

زلزله

26- **By reading this passage which question can you answer?**
1) Which buildings can stand better, steel or concrete ones?
2) How can we increase the flexibility of our structures?
3) Why are steel structures good at resisting earthquake?
4) Which buildings perform better against earthquake, old or modern?

27- **The relationship between the cost of structures and design forces is ----------.**
1) changeable 2) inverse
3) implicit 4) direct

28- **The word "namely" in paragraph 1 can be substituted by ----------.**
1) in addition 2) respectively
3) in particular 4) accordingly

29- **The seismic design in steel building is not important if ----------.**
1) the constructions occur in the area standing damage from earthquakes
2) the developers add more support to the bottom floor
3) the materials using for structures are extremely flexible and durable
4) the weight of these structures are adequately low

30- **Which sentence, based on the passage, is True?**
1) The smaller forces a building attracts, the less durable it is against earthquake.
2) Stiffer and heavier structures are not suitable for earthquake-prone regions.
3) A building designed for wind forces is not sufficiently earthquake-proof.
4) The cover surrounding a large volume should have a high flexibility.

ریاضیات:

۳۱- در تابع $f(x,y)=3x^2y^2+6xy^2-4y^3+18y$، نقطه $\left(-1,-\frac{3}{2}\right)$ چه نقطه‌ای است؟
۱) ماکزیمم است. ۲) مینیمم است.
۳) نقطه زینی است. ۴) نقطه بحرانی نیست.

۳۲- فرض کنید $f:\mathbb{R}^2\to\mathbb{R}$ تابعی مشتق‌پذیر باشد و $\lim_{x\to 0}\frac{f(x,x)-f(x,-x)}{x}=2$، در این صورت $f_y(0,0)$، کدام است؟
۱) -1
۲) -2
۳) 1
۴) 2

۳۳- مقدار انتگرال $\int_0^1\int_{\sqrt{y}}^{\sqrt[3]{y}}\sqrt{1-x^3}\,dxdy$، کدام است؟
۱) $\frac{1}{10}$
۲) $\frac{1}{20}$
۳) $\frac{1}{15}$
۴) $\frac{2}{15}$